



# Service Manual

## Serial Number Range

**S-40<sup>TM</sup>**

from S4012-17232  
to S4015-20504

**S-45<sup>TM</sup>**

**S-40<sup>TM</sup> TRAX**

**S-45<sup>TM</sup> TRAX**

Part No. 826364

Rev C1

October 2014

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## Important

Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine before attempting any maintenance or repair procedure.

This manual provides detailed scheduled maintenance information for the machine owner and user. It also provides troubleshooting fault codes and repair procedures for qualified service professionals.

Basic mechanical, hydraulic and electrical skills are required to perform most procedures. However, several procedures require specialized skills, tools, lifting equipment and a suitable workshop. In these instances, we strongly recommend that maintenance and repair be performed at an authorized Genie dealer service center.

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## Compliance

### Machine Classification

Group B/Type 3 as defined by ISO 16368

### Machine Design Life

Unrestricted with proper operation, inspection and scheduled maintenance.

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## Technical Publications

Genie has endeavored to deliver the highest degree of accuracy possible. However, continuous improvement of our products is a Genie policy. Therefore, product specifications are subject to change without notice.

Readers are encouraged to notify Genie of errors and send in suggestions for improvement. All communications will be carefully considered for future printings of this and all other manuals.

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## Contact Us:

<http://www.genielift.com>  
e-mail: [awp.techpub@terex.com](mailto:awp.techpub@terex.com)

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## Serial Number Information

Genie offers the following Service Manuals for these models:


Title	Part No.
S-40 and S-45 Service Manual (before serial number 3804) .....	32222
S-40 and S-45 Service Manual (from serial number 3804 to 4728) .....	52271
S-40 and S-45 Service Manual (from serial number 4729 to 7000) .....	72136
S-40 and S-45 Service Manual (from serial number 7001 to 17231) .....	102521

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# Revision History

Revision	Date	Section	Procedure / Schematic Page / Description
A	7/2013	New Edition	
B	1/2014	Schematics	6-6, Added Australia Schematics (6-78 - 6-95), 6-103
C	2/2014	Repair	4-44, 45- 4WD Traction Manifold
C1	10/2014	Maintenance Schematics	3-44, 3-45 6-22, 6-28
REFERENCE EXAMPLES:			
2-1_Section 2_Specifications Page #. 3-3_Section 3_Maintenance Procedure Page #. 4-48_Section 4_Repair Procedure Page #. Fault Codes_Section 5. 6-5_Section 6_Schematic Page #.			<div> <b>Electronic Version</b>            Click on any procedure or page number highlighted in blue to view the update.         </div>

**REVISION HISTORY, CONTINUED**

Revision	Date	Section	Procedure / Schematic Page / Description
<b>REFERENCE EXAMPLES:</b>			
2-1_Section 2_Specifications Page #. 3-3_Section 3_Maintenance Procedure Page #. 4-48_Section 4_Repair Procedure Page #. Fault Codes_Section 5. 6-5_Section 6_Schematic Page #.			<div> <b>Electronic Version</b>  Click on any procedure or page number  highlighted in blue to view the update. </div>



# Serial Number Legend



A TEREX BRAND

**Model:** S-40

**Serial number:** S4010-12345

**Model year:** 2010 **Manufacture date:** 04/12/10

**Electrical schematic number:** ES0274

**Machine unladen weight:**

**Rated work load (including occupants):** 500 lb / 227 kg

**Maximum number of platform occupants:** 2

**Maximum allowable side force :** 150 lb / 670 N

**Maximum allowable inclination of the chassis:**

**Maximum wind speed :** 28 mph/ 12.5 m/s

**Maximum platform height :** 40 ft 2 in/ 12.2 m

**Maximum platform reach :** 34 ft 3 in/ 10.4 m

**Gradeability:** N/A

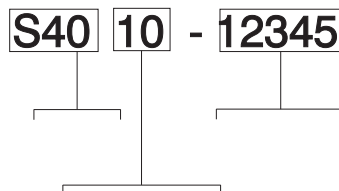
**Country of manufacture:** USA

**This machine complies with:**

Terex South Dakota  
500 Oak Wood Road  
PO Box 1150  
Watertown, SD 57201  
USA

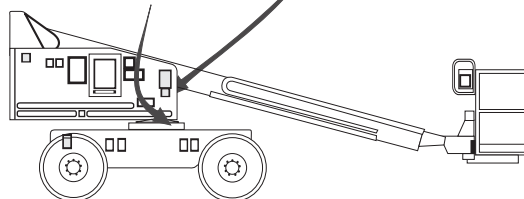


PN - 77055



Sequence Number  
(stamped on chassis)

Serial Label  
(located under cover)



# Safety Rules



## Danger

Failure to obey the instructions and safety rules in this manual, and the appropriate *Operator's Manual* will result in death or serious injury.

Many of the hazards identified in the operator's manual are also safety hazards when maintenance and repair procedures are performed.

## Do Not Perform Maintenance Unless:

- ☑ You are trained and qualified to perform maintenance on this machine.
- ☑ You read, understand and obey:
  - manufacturer's instructions and safety rules
  - employer's safety rules and worksite regulations
  - applicable governmental regulations
- ☑ You have the appropriate tools, lifting equipment and a suitable workshop.

## Personal Safety

Any person working on or around a machine must be aware of all known safety hazards. Personal safety and the continued safe operation of the machine should be your top priority.



Read each procedure thoroughly. This manual and the decals on the machine use signal words to identify the following:



Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **▲ DANGER**

Indicate the presence of an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### **▲ WARNING**

Indicate the presence of a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **▲ CAUTION**

Indicate the presence of a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### **NOTICE**

Indicate the presence of a potentially hazardous situation which, if not avoided, may result in property damage.

## SAFETY RULES



Be sure to wear protective eye wear and other protective clothing if the situation warrants it.



Be aware of potential crushing hazards such as moving parts, free swinging or unsecured components when lifting or placing loads. Always wear approved steel-toed shoes.

## Workplace Safety



Be sure to keep sparks, flames and lighted tobacco away from flammable and combustible materials like battery gases and engine fuels. Always have an approved fire extinguisher within easy reach.



Be sure that all tools and working areas are properly maintained and ready for use. Keep work surfaces clean and free of debris that could get into machine components and cause damage.



Be sure any forklift, overhead crane or other lifting or supporting device is fully capable of supporting and stabilizing the weight to be lifted. Use only chains or straps that are in good condition and of ample capacity.



Be sure that fasteners intended for one time use (i.e., cotter pins and self-locking nuts) are not reused. These components may fail if they are used a second time.



Be sure to properly dispose of old oil or other fluids. Use an approved container. Please be environmentally safe.



Be sure that your workshop or work area is properly ventilated and well lit.

# Table of Contents

## Introduction

Important Information .....	<i>ii</i>
Serial Number Legend .....	<i>iv</i>

## Section 1

### Safety Rules

General Safety Rules .....	<i>v</i>
----------------------------	----------

## Section 2

### Specifications

Machine Specifications .....	2 - 1
Hydraulic Oil Specifications .....	2 - 2
Manifold Component Specifications .....	2 - 5
Valve Coil Resistance Specifications .....	2 - 5
Ford MSG-425 EFI Engine Specifications .....	2 - 6
Deutz D2011L03i Engine Specifications .....	2 - 8
Deutz D 2.9 L4 Engine Specifications .....	2 - 10
Perkins 404D-22 Engine Specifications .....	2 - 12
Perkins 404F-22 Engine Specifications .....	2 - 13
Machine Torque Specifications .....	2 - 15
TRAX Torque Specifications .....	2 - 15
Hydraulic Hose and Fitting Torque Specifications .....	2 - 16
SAE and Metric Fastener Torque Chart .....	2 - 18

## Section 3

### Scheduled Maintenance Procedures

Introduction .....	3 - 1
Pre-Delivery Preparation .....	3 - 3
Maintenance Inspection Report .....	3 - 5

#### Checklist A Procedures

A-1 Inspect the Decals and Manuals .....	3 - 7
A-2 Perform Pre-operation Inspection .....	3 - 8
A-3 Perform Function Tests .....	3 - 8
A-4 Perform Engine Maintenance- Ford Models .....	3 - 9

## TABLE OF CONTENTS

<b>Section 3</b>	<b>Scheduled Maintenance Procedures, continued</b>	
A-5	Perform Engine Maintenance - Perkins Models .....	3 - 9
A-6	Perform Engine Maintenance - Deutz Models .....	3 - 10
A-7	Inspect the Track Components, TRAX option .....	3 - 10
A-8	Check the High Pressure Hydraulic Filter Condition Indicator .....	3 - 11
A-9	Test the Oscillate Axle (if equipped) .....	3 - 11
A-10	Perform 30 Day Service .....	3 - 12
A-11	Replace the Drive Hub Oil .....	3 - 12
A-12	Perform Engine Maintenance - Ford Models .....	3 - 13
A-13	Perform Engine Maintenance - Perkins Models .....	3 - 13
A-14	Perform Engine Maintenance - Ford Models .....	3 - 14
A-15	Grease the Turntable Rotation Bearing and Rotate Gear .....	3 - 14
A-16	Perform Engine Maintenance - Ford Models .....	3 - 15
	<b>Checklist B Procedures</b>	
B-1	Inspect the Battery .....	3 - 16
B-2	Inspect the Electrical Wiring .....	3 - 17
B-3	Check the Exhaust System .....	3 - 19
B-4	Perform Engine Maintenance - Perkins Models .....	3 - 20
B-5	Check the Oil Cooler and Cooling Fins - Deutz Models .....	3 - 20
B-6	Inspect the Tires, Wheels and Lug Nut Torque .....	3 - 22
B-7	Confirm the Proper Brake Configuration .....	3 - 22
B-8	Check the Drive Hub Oil Level and Fastener Torque .....	3 - 23
B-9	Test the Ground Control Override .....	3 - 23
B-10	Check the Directional Valve Linage .....	3 - 24
B-11	Test the Platform Self-leveling .....	3 - 24
B-12	Test the Engine Idle Select .....	3 - 25
B-13	Test the Fuel Select Operation - Ford Models .....	3 - 26

## TABLE OF CONTENTS

<b>Section 3</b>	<b>Scheduled Maintenance Procedures, continued</b>	
B-14	Test the Drive Brakes .....	3 - 27
B-15	Test the Drive Speed - Stowed Position .....	3 - 28
B-16	Test the Drive Speed - Raised or Extended Position .....	3 - 29
B-17	Test the Alarm Package (if equipped) and the Descent Alarm .....	3 - 30
B-18	Perform Hydraulic Oil Analysis .....	3 - 31
B-19	Inspect the Fuel and Hydraulic Tank Cap Venting System .....	3 - 32
B-20	Check the Track Tension and Fastener Torque - TRAX Option .....	3 - 33
B-21	Test the Emergency Power System.....	3 - 34
B-22	Perform Engine Maintenance - Ford Models .....	3 - 35
	<b>Checklist C Procedures</b>	
C-1	Grease the Platform Overload Mechanism (if equipped) .....	3 - 36
C-2	Test the Platform Overload Mechanism (if equipped) .....	3 - 36
C-3	Replace the Engine Air Filter - All Models .....	3 - 40
C-4	Perform Engine Maintenance - Perkins Models .....	3 - 41
C-5	Perform Engine Maintenance - Perkins Models .....	3 - 41
C-6	Perform Engine Maintenance - Deutz Models .....	3 - 42
C-7	Check and Adjust the Engine RPM - Perkins 404D and Deutz 2011 Models .....	3 - 42
C-8	Perform Engine Maintenance Ford Models .....	3 - 44
	<b>Checklist D Procedures</b>	
D-1	Check the Boom Wear Pads .....	3 - 46
D-2	Check the Turntable Rotation Bearing Bolts .....	3 - 47
D-3	Inspect for Turntable Bearing Wear .....	3 - 48
D-4	Replace the Drive Hub Oil .....	3 - 50
D-5	Check the Free-wheel Configuration .....	3 - 50
D-6	Replace the Hydraulic Filters .....	3 - 52
D-7	Perform Engine Maintenance - Perkins Models .....	3 - 53
D-8	Perform Engine Maintenance - Deutz Models .....	3 - 54
D-9	Perform Engine Maintenance - Deutz Models .....	3 - 54

## TABLE OF CONTENTS

<b>Section 3</b>	<b>Scheduled Maintenance Procedures, continued</b>	
	<b>Checklist E Procedures</b>	
E-1	Test or Replace the Hydraulic Oil .....	3 - 55
E-2	Grease the Steer Axle Wheel Bearings, 2WD Models .....	3 - 57
E-3	Perform Engine Maintenance - Perkins Models .....	3 - 58
E-4	Perform Engine Maintenance - Deutz Models .....	3 - 59
E-5	Perform Engine Maintenance - Deutz Models .....	3 - 59
E-6	Perform Engine Maintenance - Perkins Models .....	3 - 60
E-7	Perform Engine Maintenance - Perkins 404D-22 Models .....	3 - 60
E-8	Perform Engine Maintenance - Deutz Models .....	3 - 61
E-9	Perform Engine Maintenance - Perkins 404F-22 Models .....	3 - 61
<b>Section 4</b>	<b>Repair Procedures</b>	
	Introduction .....	4 - 1
	<b>Platform Controls</b>	
1-1	ALC-500 Circuit Board .....	4 - 2
1-2	Joysticks .....	4 - 3
	<b>Platform Components</b>	
2-1	Platform Leveling Slave Cylinder .....	4 - 8
2-2	Platform Rotator .....	4 - 9
2-3	Platform Overload System .....	4 - 11
	<b>Jib Boom Components</b>	
3-1	Jib Boom .....	4 - 14
3-2	Jib Boom Lift Cylinder .....	4 - 15
	<b>Boom Components</b>	
4-1	Cable Track .....	4 - 16
4-2	Boom .....	4 - 18
4-3	Boom Lift Cylinder .....	4 - 21
4-4	Boom Extension Cylinder .....	4 - 22
4-5	Platform Leveling Master Cylinder .....	4 - 23

## TABLE OF CONTENTS

<b>Section 4</b>	<b>Repair Procedures, continued</b>	
	<b>Engines</b>	
5-1	RPM Adjustment - Deutz Models .....	4 - 24
5-2	RPM Adjustment - Perkins Models .....	4 - 24
5-3	Flex Plate .....	4 - 24
5-4	Ford MSG-425 Engine Fault Codes .....	4 - 28
5-5	Deutz D 2.9 L4 and Perkins 404F-22 Engine Fault Codes .....	4 - 28
	<b>Hydraulic Pumps</b>	
6-1	Function Pump .....	4 - 29
6-2	Drive Pump .....	4 - 30
	<b>Manifolds</b>	
7-1	Function Manifold Components .....	4 - 32
7-2	Valve Adjustments - Function Manifold .....	4 - 36
7-3	Jib Select and Platform Rotate Manifold Components .....	4 - 37
7-4	Brake Manifold Components .....	4 - 38
7-5	Oscillate Directional Valve Manifold Components .....	4 - 39
7-6	Valve Adjustments, Oscillate Relief Valve .....	4 - 41
7-7	Traction Manifold Components, 2WD .....	4 - 42
7-8	Valve Adjustments, 2WD Traction Manifold .....	4 - 43
7-9	Traction Manifold Components, 4WD .....	4 - 44
7-10	Valve Adjustments, 4WD Traction Manifold .....	4 - 46
7-11	Drive Oil Diverter Manifold Components (welder option) .....	4 - 47
7-12	Valve Coils .....	4 - 48
	<b>Turntable Rotation Components</b>	
8-1	Turntable Rotation Assembly .....	4 - 50
	<b>Axle Components</b>	
9-1	Oscillate Axle Cylinders .....	4 - 52
	<b>Track Components</b>	
10-1	Track Assembly - TRAX Option .....	4 - 53
	<b>Generators</b>	
10-1	Hydraulic Generator .....	4 - 55



## TABLE OF CONTENTS

<b>Section 5</b>	<b>Fault Codes</b>	
	Introduction .....	5 - 1
	Fault Codes - Control System .....	5 - 2
	Fault Code Display - Deutz D 2.9 L4 and Perkins 404F-22 Models .....	5 - 6
	Fault Code Display - Flashing and Solid LED's .....	5 - 7
	Fault Code Display - Soft Key Functions and Icons .....	5 - 8
	Fault Code Display - Main Menu Structure .....	5 - 9
	Fault Codes - Deutz D 2.9 L4 Engine .....	5 - 10
	Fault Codes - Perkins 404F-22 Engine .....	5 - 25
	Fault Codes - Ford MSG-425 Engine .....	5 - 28
<b>Section 6</b>	<b>Schematics</b>	
	Introduction .....	6 - 1
	Electrical Symbols Legend .....	6 - 2
	Hydraulic Symbols Legend .....	6 - 3
	Electrical Abbreviations Legend .....	6 - 4
	Ford MSG-425 Engine Relay Layout .....	6 - 7
	Ford DSG-423 Engine Relay Layout .....	6 - 8
	Connector Pin Legend .....	6 - 10
	Engine Wire Harness	
	Deutz D 2.9 L4 Models .....	6 - 11
	Engine Wire Harness	
	Perkins 404F-22 Models .....	6 - 14
	Engine Wire Harness	
	Ford MSG425 Models .....	6 - 15

## TABLE OF CONTENTS

<b>Section 6</b>	<b>Schematics, continued</b>	
	<b>Electrical Schematics - ANSI</b>	
	Electrical Schematic - ANSI	
	Deutz D 2.9 L4 Models .....	6 - 18
	Ground Control Box Wiring Diagram - ANSI	
	Deutz D 2.9 L4 Models .....	6 - 22
	Platform Control Box Wiring Diagram - ANSI	
	Deutz D 2.9 L4 Models .....	6 - 24
	Platform Switch Panel Wiring Diagram - ANSI	
	Deutz D 2.9 L4 Models .....	6 - 25
	Electrical Schematic - ANSI	
	Perkins 404F-22 Models .....	6 - 28
	Ground Control Box Wiring Diagram - ANSI	
	Perkins 404F-22 Models .....	6 - 32
	Platform Control Box Wiring Diagram - ANSI	
	Perkins 404F-22 Models .....	6 - 34
	Platform Switch Panel Wiring Diagram - ANSI	
	Perkins 404F-22 Models .....	6 - 35
	<b>Electrical Schematics - ANSI / CSA</b>	
	Electrical Schematic - ANSI / CSA	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 38
	Ground Control Box Wiring Diagram - ANSI / CSA	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 42
	Platform Control Box Wiring Diagram - ANSI / CSA	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 44
	Platform Switch Panel Wiring Diagram - ANSI / CSA	
	Deutz Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 45

## TABLE OF CONTENTS

<b>Section 6</b>	<b>Schematics, continued</b>	
	Electrical Schematic - ANSI/CSA	
	Ford MSG-425 EFI Models .....	6 - 48
	Ground Control Box Wiring Diagram - ANSI / CSA	
	Ford MSG-425 EFI Models .....	6 - 52
	Platform Control Box Wiring Diagram - ANSI / CSA	
	Ford MSG-425 EFI Models .....	6 - 54
	Platform Switch Panel Wiring Diagram - ANSI / CSA	
	Ford MSG-425 EFI Models .....	6 - 55
	<b>Electrical Schematics - CE</b>	
	Electrical Schematic - CE	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 58
	Ground Control Box Wiring Diagram - CE	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 62
	Platform Control Box Wiring Diagram - CE	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 64
	Platform Switch Panel Wiring Diagram - CE	
	Deutz Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 65
	Electrical Schematic - CE	
	Ford MSG-425 EFI Models .....	6 - 68
	Ground Control Box Wiring Diagram - CE	
	Ford MSG-425 EFI Models .....	6 - 72
	Platform Control Box Wiring Diagram - CE	
	Ford MSG-425 EFI Models .....	6 - 74
	Platform Switch Panel Wiring Diagram - CE	
	Ford MSG-425 EFI Models .....	6 - 75

## TABLE OF CONTENTS

<b>Section 6</b>	<b>Schematics, continued</b>	
	<b>Electrical Schematics - AUS</b>	
	Electrical Schematic - AUS	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 78
	Ground Control Box Wiring Diagram - AUS	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 82
	Platform Control Box Wiring Diagram - AUS	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 84
	Platform Switch Panel Wiring Diagram - AUS	
	Deutz D2011L03i Models	
	Perkins 404D-22 Models .....	6 - 85
	Electrical Schematic - AUS	
	Ford MSG-425 EFI Models .....	6 - 88
	Ground Control Box Wiring Diagram - AUS	
	Ford MSG-425 EFI Models .....	6 - 92
	Platform Control Box Wiring Diagram - AUS	
	Ford MSG-425 EFI Models .....	6 - 94
	Platform Switch Panel Wiring Diagram - AUS	
	Ford MSG-425 EFI Models .....	6 - 95
	CTE Option Wiring Diagram .....	6 - 98
	Hydraulic Generator Option Wiring Diagram- MTE .....	6 - 99
	12.5 kW Hydraulic Generator Electrical Schematic- Welder Option .....	6 - 102
	12.5 kW Hydraulic Generator Wiring Diagram- Welder Option .....	6 - 103
	Hydraulic Schematic, 2WD .....	6 - 106
	Hydraulic Schematic, 4WD .....	6 - 107

# Specifications

## Machine Specifications S-40 and S-45 Models

### Tires and wheels

Tire size, 2WD front tires only	12.5L-16SL	
rear tires only	12-16.5 NHS	
Tire size, 2WDRT & 4WD front & rear	12-16.5 NHS	
Tire weight, new foam-filled (minimum) (Rough terrain)	300 lbs 136 kg	
Tire ply rating	12	8
Tire contact area	88 sq in 568 sq cm	57 sq in 368 sq cm
Overall tire diameter	33.7 in 85.6 cm	33.2 in 84.3 cm
Tire pressure (Rough terrain)	45 psi 3.1 bar	45 psi 3.1 bar
Tire pressure (Rough terrain)	60 psi 4.1 bar	60 psi 4.1 bar
Wheel diameter	16 in 40.6 cm	16 <sup>1</sup> / <sub>2</sub> in 41.9 cm
Wheel width	10 in 25.4 cm	9 <sup>3</sup> / <sub>4</sub> in 24.8 cm
Wheel lugs	8@ <sup>5</sup> / <sub>8</sub> -18	9@ <sup>5</sup> / <sub>8</sub> -18

### Lug nut torque - Drive and 9-bolt non-drive hubs

Lug nut, dry	230 ft-lbs 312 Nm
Lug nut, lubricated	170 ft-lbs 230 Nm

### Lug nut torque - 8-bolt non-drive spindles

Lug nut, dry	170 ft-lbs 230 Nm
Lug nut, lubricated	130 ft-lbs 176 Nm

### Track Components, TRAX option

Track material	Rubber
Weight, assembly (each)	480 lbs 218 kg

### Fluid capacities

Fuel tank	20 gallons 75.7 liters
Fuel tank, Option	30 gallons 114 liters
LPG tank	33.5 pounds 15.2 kg
Hydraulic tank	45 gallons 170 liters
Hydraulic system (including tank)	55 gallons 208 liters
Drive hub	20 fl oz 0.6 liters
Turntable rotation drive hub	8 fl oz 0.24 liters
Drive hub oil type: SAE 90 multipurpose hypoid gear oil API service classification GL5	

**For operational specifications, refer to the Operator's Manual.**

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.



## SPECIFICATIONS

## Performance Specifications All Models

### Drive speeds, 2WD and 4WD

Drive speed, stowed	40 ft / 5.2 - 5.9 sec 12.2 m / 5.2 - 5.9 sec
---------------------	---

Drive speed, raised or extended	40 ft / 40 - 45 sec 12.2 m / 40 - 45 sec
---------------------------------	---

### Drive speed, TRAX option

Drive speed, stowed	40 ft / 9 - 11 sec 12.2 m / 9 - 11 sec
---------------------	---

Drive speed, raised or extended	40 ft / 40 - 45 sec 12.2 m / 40 - 45 sec
---------------------------------	---

<b>Gradeability</b>	See Operator's Manual
---------------------	-----------------------

### Boom function speeds, maximum from platform controls

Boom up	50 to 60 seconds
---------	------------------

Boom down	45 to 60 seconds
-----------	------------------

Boom extend	30 to 60 seconds
-------------	------------------

Boom retract	15 to 35 seconds
--------------	------------------

Turntable rotate, 360° boom fully stowed	70 to 100 seconds
---	-------------------

Turntable rotate, 360° boom fully extended	120 to 140 seconds
---	--------------------

Platform level (10° range of motion) ANSI	3 to 5 seconds
CE/Australia	20 to 22 seconds

Jib boom up, S-45 models	35 to 45 seconds
--------------------------	------------------

Jib boom down, S-45 models	20 to 30 seconds
----------------------------	------------------

### Braking distance, maximum

High range on paved surface	3 to 4 ft 0.9 to 1.2 m
-----------------------------	---------------------------

## Hydraulic Oil Specifications

### Hydraulic Oil Specifications

Hydraulic oil type	Chevron Rando HD MV equivalent
Viscosity grade	Multi-viscosity
Viscosity index	200

Cleanliness level, minimum	15/13
----------------------------	-------

Water content, maximum	200 ppm
------------------------	---------

### Chevron Rando HD MV oil is fully compatible and mixable with Shell Donax TG (Dexron III) oils.

Genie specifications require hydraulic oils which are designed to give maximum protection to hydraulic systems, have the ability to perform over a wide temperature range, and the viscosity index should exceed 140. They should provide excellent antiwear, oxidation, corrosion inhibition, seal conditioning, and foam and aeration suppression properties.

### Optional fluids

Biodegradable	Petro Canada Environ MV46 Statoil Hydra Way Bio Pa 32 BP Biohyd SE-S
---------------	--

Fire resistant	UCON Hydrolube HP-5046 Quintolubric 822
----------------	--

Mineral based	Shell Tellus S2 V 32 Shell Tellus S2 V 46 Chevron Aviation A Eni ARNICA 32
---------------	---

**Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.**



## SPECIFICATIONS

**NOTICE**

Continued use of Chevron Aviation A hydraulic oil when ambient temperatures are consistently above 32°F / 0°C may result in component damage.

Note: Use Chevron Aviation A hydraulic oil when ambient temperatures are consistently below 0°F / -18°C.

Note: Use Shell Tellus S2 V 46 hydraulic oil when oil temperatures consistently exceed 205°F / 96°C.

Note: Genie specifications require additional equipment and special installation instructions for the approved optional fluids. Consult the Genie Service Department before use.

## Hydraulic Component Specifications

### Drive pump

Type: bi-directional, variable displacement piston pump

Displacement per revolution, variable, 4WD models  
0 to 2.8 cu in  
0 to 46 cc

Flow rate @ 2500 rpm  
0 to 28 gpm  
106 L/min

Drive pressure, maximum  
3625 psi  
250 bar

### Charge pump

Type: gerotor pump

Displacement  
0.85 cu in  
13.9 cc

Flow rate @ 2500 rpm  
9 gpm  
34.1 L/min

Charge pressure @ 2500 rpm  
310 psi  
Neutral position  
21.4 bar

### Function pump

Type: gear, pressure balanced

Displacement  
1.04 cu in  
17 cc

Flow rate @ 2500 rpm  
10.69 gpm  
40.5 L/min

### Oscillation pump

Type: gear, fixed displacement

Displacement  
0.37 cu in  
6 cc

Flow rate @ 2500 rpm  
2.8 gallons per minute  
10.6 liters per minute

**Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.**



## SPECIFICATIONS

**Auxiliary pump**

Type: fixed displacement gear pump

Displacement - static 0.151 cu in  
2.47 ccDisplacement 1.75 gallons per minute  
6.62 liters per minute**Function manifold**Function relief valve pressure  
S-40 2600 psi / 179 bar  
S-45 2900 psi / 200 barBoom down 2200 psi  
relief valve pressure 152 barBoom extend 1950 psi  
134 barOscillate axle 950 psi  
66 barSteer regulator, 2 gallons per minute  
All models 7.6 liters per minute**Traction manifold, 2WD and 4WD**Hot oil relief pressure 280 psi  
19.3 bar**Two-speed drive motors, 2WD and 4WD**Displacement per revolution 0.99 cu in / 16.3 cc  
low speedDisplacement per revolution 1.83 cu in / 30 cc  
high speed**Hydraulic Filters**Medium pressure filter Beta  $\beta \geq 200$ Medium pressure filter 51 psi  
bypass pressure 3.5 barHydraulic tank circuit 10 micron with  
return line filter 25 psi / 1.7 bar bypass

**Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.**





## SPECIFICATIONS

## Manifold Component Specifications

Plug torque	
SAE No. 2	36 in-lbs / 4.1 Nm
SAE No. 4	10 ft-lbs / 13.6 Nm
SAE No. 6	14 ft-lbs / 19 Nm
SAE No. 8	38 ft-lbs / 51.5 Nm
SAE No. 10	41 ft-lbs / 55.6 Nm
SAE No. 12	56 ft-lbs / 75.9 Nm

## Valve Coil Resistance Specifications

Note: The following coil resistance specifications are at an ambient temperature of 68°F / 20°C. As valve coil resistance is sensitive to changes in air temperature, the coil resistance will typically increase or decrease by 4% for each 18°F / 20°C that your air temperature increases or decreases from 68°F / 20°C.

Description	Specification
Solenoid valve, 3 position 4 way, 10V DC (schematic item BT)	4 Ω
Solenoid valve, 2 position 3 way, 10V DC (schematic items BU, BV, BX, and BZ)	4 Ω
Solenoid valve, 3 position 4 way, 10V DC (schematic items CD and CF)	5 Ω
Proportional solenoid valve, 12V DC (schematic items BI and CH)	5 Ω
Solenoid valve, 2 position 3 way, 10V DC (schematic item CC)	6.8 Ω
Solenoid valve, 2 position 3 way, 12V DC (schematic items CE)	4.8 Ω

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.



## SPECIFICATIONS

**Ford MSG-425 EFI Engine**

<b>Displacement</b>	152.5 cu in 2.5 liters
<b>Number of cylinders</b>	4
<b>Bore &amp; stroke</b>	3.50 x 3.94 inches 89 x 100 mm
<b>Horsepower</b>	
Continuous horsepower	60 @ 2500 rpm
Continuous horsepower	44.7 kW @ 2500 rpm
<b>Firing order</b>	1 - 3 - 4 - 2
<b>Idle speed</b> (computer controlled)	1000 rpm
<b>Low function idle</b> (computer controlled)	1600 rpm
<b>High function idle</b> (computer controlled)	2500 rpm
<b>Governor</b>	Electronic
<b>Compression ratio</b>	9.7:1
<b>Compression pressure (approx.)</b>	
Pressure (psi or bar) of lowest cylinder must be at least 75% of highest cylinder	
<b>Lubrication system</b>	
Oil pressure	29 to 39 psi
(at operating temperature @ 2500 rpm)	2 to 2.7 bar
Oil capacity	6.7 quarts
(including filter)	6.4 liters
Oil switch pressure point	7-9 psi
	0.48 to 0.62 bar

**Electronic fuel pump**

Fuel pressure, static	60 psi 4.14 bar
Fuel flow rate	0.43 gpm 1.6 L/min

**Ignition system**

Spark plug type	Motorcraft AGSF-32-FEC
Spark plug gap	0.049 to 0.053 inches 1.244 to 1.346 mm

**Engine coolant**

Capacity	10 quarts 9.5 liters
Operating pressure	13-18 psi
Normal operating temperature	205° F

**Cylinder head temperature sending unit**

Fault code set temperature	280°F 138°C
Engine shut-down temperature	300°F 149°C

Continuous improvement of our products is a Genie policy. Product specifications are subject to change without notice.



## SPECIFICATIONS

**Ford MSG-425 Engine, continued****Starter motor**

Normal engine cranking speed	200 to 250 rpm
Current draw, normal load	140-200A
Current draw, maximum load	800A

**Alternator**

Output	95A, 13.8V DC
--------	---------------

**Battery**

Type	12V DC, Group 31
Quantity	1
Cold cranking ampere @ 0°F	1000A
Reserve capacity @ 25A rate	200 minutes

## SPECIFICATIONS

**Deutz D2011L03i Engine**

<b>Displacement</b>	142 cu in 2.33 liters
---------------------	--------------------------

<b>Number of cylinders</b>	3
----------------------------	---

<b>Bore and stroke</b>	3.7 x 4.4 inches 94 x 112 mm
------------------------	---------------------------------

**Horsepower**

Net intermittent	48.7 @ 2800 rpm
Net continuous	46.2 @ 2800 rpm
Net intermittent	36 kW @ 2800 rpm
Net continuous	34.5 kW @ 2800 rpm

<b>Firing order</b>	1 - 2 - 3
---------------------	-----------

<b>Low idle rpm</b>	1500 rpm
Frequency	313 Hz

<b>High idle rpm</b>	2500 rpm
Frequency	521.7 Hz

<b>Compression ratio</b>	19:1
--------------------------	------

<b>Compression pressure</b>	362 to 435 psi 25 to 30 bar
-----------------------------	--------------------------------

<b>Governor</b>	centrifugal mechanical
-----------------	------------------------

**Valve clearance, cold**

Intake	0.012 in 0.3 mm
--------	--------------------

Exhaust	0.020 in 0.5 mm
---------	--------------------

**Lubrication system**

Oil pressure, hot @ 2000 rpm	40-60 psi 2.8 to 4.1 bar
------------------------------	-----------------------------

Oil capacity (including filter)	9.5 quarts 9 liters
------------------------------------	------------------------

**Oil viscosity requirements**

Unit ships with 15-W40 oil.  
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the engine Operator's Manual on your machine.

**Oil temperature switch**

Torque	8-18 ft-lbs 11-24 Nm
--------	-------------------------

Temperature switch point	220° F 104° C
--------------------------	------------------

**Oil pressure switch**

Torque	8-18 ft-lbs 11-24 Nm
--------	-------------------------

Oil pressure switch point	22 psi 1.5 bar
---------------------------	-------------------

**Fuel injection system**

Injection pump make	Bosch
---------------------	-------

Injection pump pressure, maximum	15000 psi 1034 bar
----------------------------------	-----------------------

Injector opening pressure	3046 psi 210 bar
---------------------------	---------------------

## SPECIFICATIONS

**Deutz D 2011 L03i Engine, continued****Fuel requirement**

For fuel requirement, refer to the engine Operator's Manual on your machine.

**Starter motor**

Current draw, normal load	140-200A
Brush length, new	0.72 in 18.5 mm
Brush length, minimum	0.27 in 7 mm

**Battery**

Type	12V, Group 31
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes

<b>Alternator output</b>	60A @ 14V DC
--------------------------	--------------

<b>Fan belt deflection</b>	$\frac{3}{8}$ to $\frac{1}{2}$ inch 9 to 12 mm
----------------------------	---

## SPECIFICATIONS

**Deutz D 2.9 L4 Engine**

<b>Displacement</b>	177 cu in 2.9 liters
<b>Number of cylinders</b>	4
<b>Bore and stroke</b>	3.6 x 4.3 inches 92 x 110 mm
<b>Horsepower</b>	48.8 @ 2600 rpm 37 kW @ 2600 rpm
<b>Firing order</b>	1 - 3 - 4 - 2
<b>Low idle</b>	1500 rpm 313 Hz
<b>High idle</b>	2500 rpm 521.7 Hz
<b>Compression ratio</b>	18.4:1
<b>Compression pressure</b>	362 to 435 psi 25 to 30 bar
<b>Governor</b>	electronic
<b>Lubrication system</b>	
Oil pressure (@ 2000 rpm)	40 to 60 psi 1.4 to 3 bar
Oil capacity (including filter)	9.4 quarts 9 liters

**Oil viscosity requirements**

-22° F to 86° F / -30° C to 30° C	5W-30 (synthetic)
-4° F to 90° F / -20° C to 32° C	10W-40
Above 23° F / -5° C	20W-50

Units ship with 15W-40.

Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.

**Oil temperature switch**

Temperature switch point	257°F 125°C
--------------------------	----------------

**Oil pressure switch**

Oil pressure switch point	20 psi 1.4 bar
---------------------------	-------------------

**Engine coolant**

Capacity	10 quarts 9.4 liters
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**Fuel injection system**

Injection pump make	Bosch
Injection pump pressure, maximum	15000 psi 1034 bar
Injector opening pressure	3046 psi 210 bar

**Fuel requirement**

For fuel requirements, refer to the engine Operator's Manual on your machine.

## SPECIFICATIONS

**Deutz D 2.9 L4 Engine, continued**

<b>Starter motor</b>	
Cranking speed	150-250 RPM
Current draw, normal load	250A to 400A
Output	3.2kW
<b>Battery</b>	
Type	12V DC
Size	13 x 6 <sup>13</sup> / <sub>16</sub> x 9 <sup>3</sup> / <sub>8</sub> inches 33 x 17.3 x 23.8 cm
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes
<b>Alternator output</b>	95A @ 14V DC
<b>Fan belt deflection</b>	<sup>3</sup> / <sub>8</sub> to 1/2 inch 9 to 12 mm

## SPECIFICATIONS

**Perkins 404D-22 Engine**

<b>Displacement</b>	134 cu in 2.2 liters
<b>Number of cylinders</b>	4
<b>Bore and stroke</b>	3.31 x 3.94 inches 84 x 100 mm
<b>Horsepower</b>	
gross intermittent	50 @ 2800 rpm
continuous	41 @ 2800 rpm
gross intermittent	37.3 kW @ 2800 rpm
continuous	31 kW @ 2800 rpm
<b>Firing order</b>	1 - 3 - 4 - 2
<b>Low idle rpm</b>	1300 rpm
Frequency	200.5 Hz
<b>Low idle rpm with generator option</b>	1500 rpm
Frequency	231.3 Hz
<b>High idle rpm</b>	2500 rpm
Frequency	385.5 Hz
<b>Compression ratio</b>	22.4:1
<b>Compression pressure</b>	426 psi 29.4 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
<b>Governor</b>	centrifugal mechanical
<b>Valve clearance, cold</b>	
Intake	0.008 in 0.2 mm
Exhaust	0.008 in 0.2 mm
<b>Lubrication system</b>	
Oil pressure, hot (at 2000 rpm)	40 to 60 psi 2.8 to 4.1 bar
Oil capacity (including filter)	9.4 quarts to 11.2 quarts 8.9 liters to 10.6 liters

**Oil viscosity requirements**

Unit ships with 15-W40 oil.  
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the engine Operator's Manual on your machine.

**Oil pressure sending unit**

Torque	8-18 ft-lbs 11-24 Nm
--------	-------------------------

Oil pressure switch point	14.2 psi 1 bar
---------------------------	-------------------

**Coolant temperature sending unit**

Torque	8-18 ft-lbs 11-24 Nm
--------	-------------------------

Temperature switch point	221° F 105° C
--------------------------	------------------

**Fuel injection system**

Injection pump make	Zexel
Injection pressure	2133 psi 147 bar

**Fuel requirement**

For fuel requirement, refer to the engine Operator's Manual on your machine.

**Battery**

Type	12V, Group 31
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes

**Starter motor**

Current draw, normal load	140-200A
---------------------------	----------

<b>Alternator output</b>	65A @ 13.8V DC
--------------------------	----------------

<b>Fan belt deflection</b>	3/8 to 1/2 in 9 to 12 mm
----------------------------	-----------------------------





## SPECIFICATIONS

**Perkins 404F-22 Engine**

<b>Displacement</b>	134 cu in 2.2 liters
<b>Number of cylinders</b>	4
<b>Bore and stroke</b>	3.31 x 3.94 inches 84 x 100 mm
<b>Horsepower</b>	48 @ 2800 rpm 38 kW @ 2500 rpm
<b>Firing order</b>	1 - 3 - 4 - 2
<b>Low idle</b>	1300 rpm 229.7 Hz
<b>High idle</b>	2500 rpm 441.7 Hz
<b>Compression ratio</b>	23.3:1
<b>Compression pressure</b>	426 psi 29.4 bar
Pressure (psi) of lowest cylinder must be within 50 psi / 3.45 bar of highest cylinder	
<b>Governor</b>	electronic
<b>Valve clearance, cold</b>	
Intake	0.008 in 0.2 mm
Exhaust	0.008 in 0.2 mm

**Lubrication system**

Oil pressure (@ 2000 rpm)	40 to 60 psi 1.4 to 3 bar
------------------------------	------------------------------

Oil capacity (including filter)	9.4 - 11.2 quarts 8.9 - 10.6 liters
------------------------------------	--

**Oil viscosity requirements**

Below 86°F / 30°C	5W-20
-4°F to 104°F / -20°C to 40°C	10W-30
Above 14°F / -10°C	15W-40

Units ship with 15W-40.  
Extreme operating temperatures may require the use of alternative engine oils. For oil requirements, refer to the Engine Operator Handbook on your machine.

**Oil pressure sending unit**

Oil pressure switch point	14.2 psi 1 bar
---------------------------	-------------------

**Fuel injection system**

Injection pump make	Zexel
Injection pressure	2133 psi 147 bar

**Fuel requirement**

For fuel requirements, refer to the engine Operator's Manual on your machine.

<b>Alternator output</b>	85A @ 12V DC
--------------------------	--------------

<b>Fan belt deflection</b>	<sup>3</sup> / <sub>8</sub> in 10 mm
----------------------------	---

**Starter motor**

Current draw, normal load	140A - 200A
Brush length, new	0.7480 in 19 mm
Brush length, minimum	0.5 in 12.7 mm



## SPECIFICATIONS

**Perkins 404F-22 Engine, continued****Battery**

Type	12V DC
Size	13 x 6 <sup>13/16</sup> x 9 <sup>3/8</sup> inches 33 x 17.3 x 23.8 cm
Quantity	1
Cold cranking ampere	1000A
Reserve capacity @ 25A rate	200 minutes

**Engine coolant**

Capacity	7.7 quarts 7.3 liters
----------	--------------------------

**Coolant temperature sending unit**

Temperature switch point	221° F 105° C
--------------------------	------------------

## SPECIFICATIONS

**Machine Torque Specifications****Platform rotator**

1-8 center bolt, Gr 5, dry	640 ft-lbs 868 Nm
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1-8 center bolt, Gr 5, lubricated	480 ft-lbs 651 Nm
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3/8 -16 bolts, Gr 8, lubricated *use blue thread-locking compound	35 ft-lbs* 47.5 Nm
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**Turntable rotator**

Drive hub mounting bolts, dry	210 ft-lbs 284 Nm
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Drive hub mounting bolts, lubricated* *use blue thread-locking compound	160 ft-lbs 217 Nm
--	----------------------

**Drive motor and hubs**

Drive hub mounting bolts, dry	210 ft-lbs 284 Nm
-------------------------------	----------------------

Drive hub mounting bolts, lubricated *use blue thread-locking compound	160 ft-lbs* 217 Nm
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Drive motor mounting bolts, dry	49 ft-lbs 66.4 Nm
---------------------------------	----------------------

Drive motor mounting bolts, lubricated	37 ft-lbs 50 Nm
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**Turntable bearing**

Turntable bearing mounting bolts, lubricated	180 ft-lbs 244 Nm
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**TRAX Torque Specifications****Hub to drive sprocket fasteners**

Lug nut, dry	230 ft-lbs 312 Nm
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Lug nut, lubricated	170 ft-lbs 230 Nm
---------------------	----------------------

**Idler and bogey wheel fasteners**

3/4 -10 bolts, GR 8, dry	375 ft-lbs 508 Nm
--------------------------	----------------------

3/4 -10 bolts, GR 8, lubricated	281 ft-lbs 381 N
---------------------------------	---------------------

## SPECIFICATIONS

## Hydraulic Hose and Fitting Torque Specifications

Your machine is equipped with Parker Seal-Lok® fittings and hose ends. Genie specifications require that fittings and hose ends be torqued to specification when they are removed and installed or when new hoses or fittings are installed.

### Seal-Lok™ Fittings (hose end - ORFS)

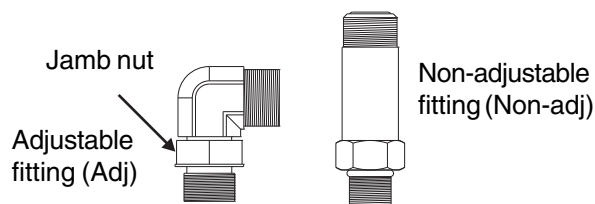
SAE Dash size	Torque
-4	10 ft-lbs / 13.6 Nm
-6	30 ft-lbs / 40.7 Nm
-8	40 ft-lbs / 54.2 Nm
-10	60 ft-lbs / 81.3 Nm
-12	85 ft-lbs / 115 Nm
-16	110 ft-lbs / 150 Nm
-20	140 ft-lbs / 190 Nm
-24	180 ft-lbs / 245 Nm

### JIC 37° Fittings (swivel nut or hose connection)

SAE Dash size	Thread Size	Flats
-4	7/16-20	2
-6	9/16-18	1 1/4
-8	3/4-16	1
-10	7/8-14	1
-12	1 1/16-12	1
-16	1 5/16-12	1
-20	1 5/8-12	1
-24	1 7/8-12	1

### SAE O-ring Boss Port (tube fitting - installed into Aluminum) (all types)

SAE Dash size	Torque
-4	14 ft-lbs / 19 Nm
-6	23 ft-lbs / 31.2 Nm
-8	36 ft-lbs / 54.2 Nm
-10	62 ft-lbs / 84 Nm
-12	84 ft-lbs / 114 Nm
-16	125 ft-lbs / 169.5 Nm
-20	151 ft-lbs / 204.7 Nm
-24	184 ft-lbs / 249.5 Nm



### SAE O-ring Boss Port (tube fitting - installed into Steel)

SAE Dash size	Torque
-4 ORFS / 37° (Adj)	15 ft-lbs / 20.3 Nm
ORFS (Non-adj)	26 ft-lbs / 35.3 Nm
37° (Non-adj)	22 ft-lbs / 30 Nm
-6 ORFS (Adj / Non-adj)	35 ft-lbs / 47.5 Nm
37° (Adj / Non-adj)	29 ft-lbs / 39.3 Nm
-8 ORFS (Adj / Non-adj)	60 ft-lbs / 81.3 Nm
37° (Adj / Non-adj)	52 ft-lbs / 70.5 Nm
-10 ORFS (Adj / Non-adj)	100 ft-lbs / 135.6 Nm
37° (Adj / Non-adj)	85 ft-lbs / 115.3 Nm
-12 (All types)	135 ft-lbs / 183 Nm
-16 (All types)	200 ft-lbs / 271.2 Nm
-20 (All types)	250 ft-lbs / 339 Nm
-24 (All types)	305 ft-lbs / 413.5 Nm



## SPECIFICATIONS

## Torque Procedure

### Seal-Lok™ fittings

- 1 Replace the O-ring. The O-ring must be replaced anytime the seal has been broken. The O-ring cannot be re-used if the fitting or hose end has been tightened beyond finger tight.

Note: The O-rings used in the Parker Seal Lok™ fittings and hose ends are custom-size O-rings. They are not standard SAE size O-rings. They are available in the O-ring field service kit (Genie part number 49612).

- 2 Lubricate the O-ring before installation.
- 3 Be sure that the face seal O-ring is seated and retained properly.
- 4 Position the tube and nut squarely on the face seal end of the fitting and tighten the nut finger tight.
- 5 Tighten the nut or fitting to the appropriate torque per given size as shown in the table.
- 6 Operate all machine functions and inspect the hoses and fittings and related components to confirm that there are no leaks.

### JIC 37° fittings

- 1 Align the tube flare (hex nut) against the nose of the fitting body (body hex fitting) and tighten the hex nut to the body hex fitting to hand-tight, approximately 30 in-lbs / 3.4 Nm.
- 2 Make a reference mark on one of the flats of the hex nut, and continue it on to the body hex fitting with a permanent ink marker. Refer to Figure 1.

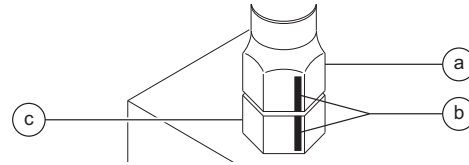


Figure 1

- a hex nut
- b reference mark
- c body hex fitting

- 3 Working clockwise on the body hex fitting, make a second mark with a permanent ink marker to indicate the proper tightening position. Refer to Figure 2.

Note: Use the *JIC 37° Fittings* table on the previous page to determine the correct number of flats for the proper tightening position.

Note: The marks indicate that the correct tightening positions have been determined. Use the second mark on the body hex fitting to properly tighten the joint after it has been loosened.

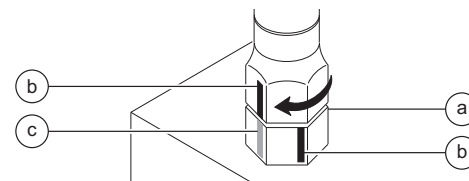








Figure 2

- a body hex fitting
- b reference mark
- c second mark

- 4 Tighten the hex nut until the mark on the hex nut is aligned with the second mark on the body hex fitting.
- 5 Operate all machine functions and inspect the hoses and fittings and related components to confirm that there are no leaks.

## SPECIFICATIONS

SAE FASTENER TORQUE CHART																
• This chart is to be used as a guide only unless noted elsewhere in this manual •																
SIZE	THREAD	Grade 5 				Grade 8 				A574 High Strength Black Oxide Bolts						
		LUBED		DRY		LUBED		DRY		LUBED						
		in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm					
1/4	20	80	9	100	11.3	110	12.4	140	15.8	130	14.7					
	28	90	10.1	120	13.5	120	13.5	160	18	140	15.8					
		LUBED		DRY		LUBED		DRY		LUBED						
		ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm					
5/16	18	13	17.6	17	23	18	24	25	33.9	21	28.4					
	24	14	19	19	25.7	20	27.1	27	36.6	24	32.5					
3/8	16	23	31.2	31	42	33	44.7	44	59.6	38	51.5					
	24	26	35.2	35	47.4	37	50.1	49	66.4	43	58.3					
7/16	14	37	50.1	49	66.4	50	67.8	70	94.7	61	82.7					
	20	41	55.5	55	74.5	60	81.3	80	108.4	68	92.1					
1/2	13	57	77.3	75	101.6	80	108.4	110	149	93	126					
	20	64	86.7	85	115	90	122	120	162	105	142					
9/16	12	80	108.4	110	149	120	162	150	203	130	176					
	18	90	122	120	162	130	176	170	230	140	189					
5/8	11	110	149	150	203	160	217	210	284	180	244					
	18	130	176	170	230	180	244	240	325	200	271					
3/4	10	200	271	270	366	280	379	380	515	320	433					
	16	220	298	300	406	310	420	420	569	350	474					
7/8	9	320	433	430	583	450	610	610	827	510	691					
	14	350	474	470	637	500	678	670	908	560	759					
1	8	480	650	640	867	680	922	910	1233	770	1044					
	12	530	718	710	962	750	1016	990	1342	840	1139					
1 1/8	7	590	800	790	1071	970	1315	1290	1749	1090	1477					
	12	670	908	890	1206	1080	1464	1440	1952	1220	1654					
1 1/4	7	840	1138	1120	1518	1360	1844	1820	2467	1530	2074					
	12	930	1260	1240	1681	1510	2047	2010	2725	1700	2304					
1 1/2	6	1460	1979	1950	2643	2370	3213	3160	4284	2670	3620					
	12	1640	2223	2190	2969	2670	3620	3560	4826	3000	4067					
METRIC FASTENER TORQUE CHART																
• This chart is to be used as a guide only unless noted elsewhere in this manual •																
Size (mm)	Class 4.6 				Class 8.8 				Class 10.9 				Class 12.9 			
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm	in-lbs	Nm
5	16	1.8	21	2.4	41	4.63	54	6.18	58	6.63	78	8.84	68	7.75	91	10.3
6	19	3.05	36	4.07	69	7.87	93	10.5	100	11.3	132	15	116	13.2	155	17.6
7	45	5.12	60	6.83	116	13.2	155	17.6	167	18.9	223	25.2	195	22.1	260	29.4
	LUBED		DRY		LUBED		DRY		LUBED		DRY		LUBED		DRY	
	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm	ft-lbs	Nm
8	5.4	7.41	7.2	9.88	14	19.1	18.8	25.5	20.1	27.3	26.9	36.5	23.6	32	31.4	42.6
10	10.8	14.7	14.4	19.6	27.9	37.8	37.2	50.5	39.9	54.1	53.2	72.2	46.7	63.3	62.3	84.4
12	18.9	25.6	25.1	34.1	48.6	66	64.9	88	69.7	94.5	92.2	125	81	110	108	147
14	30.1	40.8	40	54.3	77.4	105	103	140	110	150	147	200	129	175	172	234
16	46.9	63.6	62.5	84.8	125	170	166	226	173	235	230	313	202	274	269	365
18	64.5	87.5	86.2	117	171	233	229	311	238	323	317	430	278	377	371	503
20	91	124	121	165	243	330	325	441	337	458	450	610	394	535	525	713
22	124	169	166	225	331	450	442	600	458	622	612	830	536	727	715	970
24	157	214	210	285	420	570	562	762	583	791	778	1055	682	925	909	1233

# Scheduled Maintenance Procedures



## Observe and Obey:

- ☑ Maintenance inspections shall be completed by a person trained and qualified on the maintenance of this machine.
- ☑ Scheduled maintenance inspections shall be completed daily, quarterly, six months, annually and every 2 years as specified on the *Maintenance Inspection Report*.

**⚠ WARNING** Failure to perform each procedure as presented and scheduled may cause death, serious injury or substantial damage.

- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating machine.
- ☑ Use only Genie Approved replacement parts.
- ☑ Machines that have been out of service for a period longer than three months must complete the quarterly inspection.
- ☑ Unless otherwise specified, perform each maintenance procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power disconnected from the machine

## About This Section

This section contains detailed procedures for each scheduled maintenance inspection.

Each procedure includes a description, safety information and step-by-step instructions.

### Symbols Legend



Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.



Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

- ⦿ Indicates that a specific result is expected after performing a series of steps.
- ✗ Indicates that an incorrect result has occurred after performing a series of steps.

## SCHEDULED MAINTENANCE PROCEDURES

**Maintenance Symbols Legend**

Note: The following symbols have been used in this manual to help communicate the intent of the instructions. When one or more of the symbols appear at the beginning of a maintenance procedure, it conveys the meaning below.



Indicates that tools will be required to perform this procedure.



Indicates that new parts will be required to perform this procedure.



Indicates that a cold engine will be required to perform this procedure.



Indicates that a warm engine will be required to perform this procedure.



Indicates dealer service is required to perform this procedure.

**Pre-delivery Preparation Report**

The pre-delivery preparation report contains checklists for each type of scheduled inspection.

Make copies of the *Pre-delivery Preparation* report to use for each inspection. Store completed forms as required.

**Maintenance Schedule**

There are five types of maintenance inspections that must be performed according to a schedule—daily, quarterly, every six months, annual and two years. The *Scheduled Maintenance Procedures Section* and the *Maintenance Inspection Report* have been divided into five subsections—A, B, C, D and E. Use the following chart to determine which group(s) of procedures are required to perform a scheduled inspection.

Inspection	Table or Checklist
Daily or every 8 hours	A
Quarterly or every 250 hours	A + B
Six months or every 500 hours	A + B + C
Annual or every 1000 hours	A + B + C + D
Two years or every 2000 hours	A + B + C + D + E

**Maintenance Inspection Report**

The maintenance inspection report contains checklists for each type of scheduled inspection.

Make copies of the *Maintenance Inspection Report* to use for each inspection. Maintain completed forms for a minimum of 4 years or in compliance with employer, jobsite and governmental regulations and requirements.



# Pre-Delivery Preparation

## Fundamentals

It is the responsibility of the dealer to perform the Pre-delivery Preparation.

The Pre-delivery Preparation is performed prior to each delivery. The inspection is designed to discover if anything is apparently wrong with a machine before it is put into service.

A damaged or modified machine must never be used. If damage or any variation from factory delivered condition is discovered, the machine must be tagged and removed from service.

Repairs to the machine may only be made by a qualified service technician, according to the manufacturer's specifications.

Scheduled maintenance inspections shall be performed by qualified service technicians, according to the manufacturer's specifications and the requirements listed in the responsibilities manual.

## Instructions

Use the operator's manual on your machine.

The Pre-delivery Preparation consists of completing the Pre-operation Inspection, the Maintenance items and the Function Tests.

Use this form to record the results. Place a check in the appropriate box after each part is completed. Follow the instructions in the operator's manual.

If any inspection receives an N, remove the machine from service, repair and re-inspect it. After repair, place a check in the R box.

### Legend

Y = yes, completed

N = no, unable to complete

R = repaired

### Comments

Pre-Delivery Preparation	Y	N	R
Pre-operation inspection completed			
Maintenance items completed			
Function tests completed			

Model

Serial number

Date

Machine owner

Inspected by (print)

Inspector signature

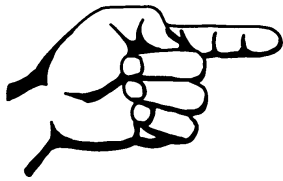
Inspector title

Inspector company



Terex South Dakota, Inc USA  
500 Oak Wood Road  
PO Box 1150  
Watertown, SD 57201-6150  
(605) 882-4000

Genie UK  
The Maltings, Wharf Road  
Grantham, Lincolnshire  
NG31-6BH England  
(44) 1476-584333



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# Maintenance Inspection Report

<b>Model</b>
<b>Serial number</b>
<b>Date</b>
<b>Hour meter</b>
<b>Machine owner</b>
<b>Inspected by (print)</b>
<b>Inspector signature</b>
<b>Inspector title</b>
<b>Inspector company</b>

## Instructions

- Make copies of both pages to use for each inspection.
- Select the appropriate checklist(s) for the type of inspection to be performed.

<input type="checkbox"/>	<b>Daily or 8 hour Inspection:</b>	<b>A</b>
<input type="checkbox"/>	<b>Quarterly or 250 hour Inspection:</b>	<b>A+B</b>
<input type="checkbox"/>	<b>Six Month or 500 hour Inspection:</b>	<b>A+B+C</b>
<input type="checkbox"/>	<b>Annual or 1000 hours Inspection:</b>	<b>A+B+C+D</b>
<input type="checkbox"/>	<b>2 Year or 2000 hour Inspection:</b>	<b>A+B+C+D+E</b>

- Place a check in the appropriate box after each inspection procedure is completed.
- Use the step-by-step procedures in this section to learn how to perform these inspections.
- If any inspection receives an "N", tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.

## Legend

Y = yes, acceptable

N = no, remove from service

R = repaired

<b>Checklist A</b>	<b>Y</b>	<b>N</b>	<b>R</b>
A-1 Manuals and Decals			
A-2 Pre-operation inspection			
A-3 Functions tests			
A-4 Engine maintenance - Ford models			
A-5 Engine maintenance - Perkins models			
A-6 Engine maintenance - Deutz models			
A-7 Inspect Trax			
A-8 Filter condition indicator			
A-9 Oscillate axle			

## Perform after 40 hours:

A-10 30 day service			
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## Perform after 50 hours:

A-11 Replace drive hub oil			
A-12 Engine maintenance - Ford models			

## Perform every 50 hours:

A-13 Engine maintenance - Perkins models			
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## Perform every 100 hours:

A-14 Engine maintenance - Ford models			
A-15 Grease the rotation bearing			

## Perform every 200 hours:

A-16 Engine maintenance - Ford models			
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<b>Checklist B</b>	<b>Y</b>	<b>N</b>	<b>R</b>
B-1 Battery			
B-2 Electrical wiring			
B-3 Exhaust system			
B-4 Engine maintenance - Perkins models			
B-5 Oil cooler and fins- Deutz models			
B-6 Tires and wheels			
B-7 Brake configuration			
B-8 Drive hub oil level			
B-9 Ground control override			
B-10 Directional valve			
B-11 Platform leveling			
B-12 Engine idle select			
B-13 Fuel select - Ford models			
B-14 Drive brakes			
B-15 Drive speed - stowed position			
B-16 Drive speed - raised position			
B-17 Alarm package			
B-18 Hydraulic oil analysis			
B-19 Fuel and hydraulic tank cap venting			
B-20 Check the TRAX option			
B-21 Emergency power sytem			

## Perform every 400 hours:

B-22 Engine maintenance - Ford models			
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## Comments

## MAINTENANCE INSPECTION REPORT

<b>Model</b>
<b>Serial number</b>
<b>Date</b>
<b>Hour meter</b>
<b>Machine owner</b>
<b>Inspected by (print)</b>
<b>Inspector signature</b>
<b>Inspector title</b>
<b>Inspector company</b>

**Instructions**

- Make copies of both pages to use for each inspection.
- Select the appropriate checklist(s) for the type of inspection to be performed.

<input type="checkbox"/>	<b>Daily or 8 hour Inspection:</b>	<b>A</b>
<input type="checkbox"/>	<b>Quarterly or 250 hour Inspection:</b>	<b>A+B</b>
<input type="checkbox"/>	<b>Six Month or 500 hour Inspection:</b>	<b>A+B+C</b>
<input type="checkbox"/>	<b>Annual or 1000 hours Inspection:</b>	<b>A+B+C+D</b>
<input type="checkbox"/>	<b>2 Year or 2000 hour Inspection:</b>	<b>A+B+C+D+E</b>

- Place a check in the appropriate box after each inspection procedure is completed.
- Use the step-by-step procedures in this section to learn how to perform these inspections.
- If any inspection receives an "N", tag and remove the machine from service, repair and re-inspect it. After repair, place a check in the "R" box.

**Legend**

Y = yes, acceptable

N = no, remove from service

R = repaired

<b>Checklist C</b>		<b>Y</b>	<b>N</b>	<b>R</b>
C-1	Grease platform overload (if equipped)			
C-2	Test platform overload (if equipped)			
C-3	Replace air filter			
C-4	Engine maintenance - Deutz models			
C-5	Engine maintenance - Perkins models			
C-6	Engine maintenance - Perkins models			
C-7	Adjust RPM			

**Perform every 800 hours:**

C-8	Engine maintenance - Ford models			
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<b>Checklist D</b>		<b>Y</b>	<b>N</b>	<b>R</b>
D-1	Boom wear pads			
D-2	Turntable bearing bolts			
D-3	Turntable bearing wear			
D-4	Drive hub oil			
D-5	Free-wheel configuration			
D-6	Hydraulic filters			
D-7	Engine maintenance - Perkins models			
D-8	Engine maintenance - Deutz models			

**Perform every year:**

D-9	Engine maintenance - Deutz models			
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<b>Checklist E</b>		<b>Y</b>	<b>N</b>	<b>R</b>
E-1	Hydraulic oil			
E-2	Grease steer axle wheel bearings, 2WD models			
E-3	Engine maintenance - Perkins models			

**Perform every 2 years:**

E-4	Engine maintenance - Deutz models			
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**Perform every 3000 hours:**

E-5	Engine maintenance - Deutz models			
E-6	Engine maintenance - Perkins models			
E-7	Engine maintenance - Perkins models			

**Perform every 6000 hours:**

E-8	Engine maintenance - Deutz models			
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**Perform every 12000 hours:**

E-9	Engine maintenance - Perkins models			
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**Comments**

# Checklist A Procedures

## A-1

### Inspect the Manuals and Decals

Genie specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Maintaining the operator's and safety manuals in good condition is essential to safe machine operation. Manuals are included with each machine and should be stored in the container provided in the platform. An illegible or missing manual will not provide safety and operational information necessary for a safe operating condition.

In addition, maintaining all of the safety and instructional decals in good condition is mandatory for safe machine operation. Decals alert operators and personnel to the many possible hazards associated with using this machine. They also provide users with operation and maintenance information. An illegible decal will fail to alert personnel of a procedure or hazard and could result in unsafe operating conditions.

- 1 Check to make sure that the operator's and safety manuals are present and complete in the storage container on the platform.

- 2 Examine the pages of each manual to be sure that they are legible and in good condition.

⦿ Result: The operator's manual is appropriate for the machine and all manuals are legible and in good condition.

✗ Result: The operator's manual is not appropriate for the machine or all manuals are not in good condition or are illegible. Remove the machine from service until the manual is replaced.

- 3 Open the operator's manual to the decals inspection section. Carefully and thoroughly inspect all decals on the machine for legibility and damage.

⦿ Result: The machine is equipped with all required decals, and all decals are legible and in good condition.

✗ Result: The machine is not equipped with all required decals, or one or more decals are illegible or in poor condition. Remove the machine from service until the decals are replaced.

- 4 Always return the manuals to the storage container after use.

Note: Contact your authorized Genie distributor or Genie if replacement manuals or decals are needed.

## CHECKLIST A PROCEDURES

**A-2****Perform Pre-operation Inspection**

Completing a pre-operation inspection is essential to safe machine operation. The pre-operation inspection is a visual inspection performed by the operator prior to each work shift. The inspection is designed to discover if anything is apparently wrong with a machine before the operator performs the function tests. The pre-operation inspection also serves to determine if routine maintenance procedures are required.

Complete information to perform this procedure is available in the appropriate operator's manual. Refer to the Operator's Manual on your machine.

**A-3****Perform Function Tests**

Completing the function tests is essential to safe machine operation. Function tests are designed to discover any malfunctions before the machine is put into service. A malfunctioning machine must never be used. If malfunctions are discovered, the machine must be tagged and removed from service.

Complete information to perform this procedure is available in the appropriate operator's manual. Refer to the Operator's Manual on your machine.

## CHECKLIST A PROCEDURES

## A-4 Perform Engine Maintenance - Ford Models



Engine specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Proper engine maintenance, following the engine manufacturer's maintenance schedule, is essential to good engine performance and service life. Failure to perform the maintenance procedures can lead to poor engine performance and component damage.

- Oil level- check
- Coolant level- check
- Oil, fuel and coolant systems- check for leaks
- Air filter discharge valve- clean

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (EDI part number 1020010)

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<b>Ford MSG 425 EFI Operator Handbook</b>	
Genie part number	215322

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## A-5 Perform Engine Maintenance - Perkins Models



Engine specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Proper engine maintenance, following the engine manufacturer's maintenance schedule, is essential to good engine performance and service life. Failure to perform the maintenance procedures can lead to poor engine performance and component damage.

- Oil level- check
- Coolant level- check
- Oil, fuel and coolant systems- check for leaks
- Air filter discharge valve- clean

*Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

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<b>Perkins 400 Series Operation Manual</b>	
Genie part number	94890

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<b>Perkins 404F Series Operation Manual</b>	
Genie part number	1251562

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## CHECKLIST A PROCEDURES

**A-6****Perform Engine Maintenance - Deutz Models**

Engine specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Proper engine maintenance, following the engine manufacturer's maintenance schedule, is essential to good engine performance and service life. Failure to perform the maintenance procedures can lead to poor engine performance and component damage.

**All models:**

- Oil level- check
- Coolant level- check
- Oil, fuel and coolant systems- check for leaks
- Fuel pre-filter- drain water
- Air filter discharge valve- clean

**D 2.9 L4 Models:**

- Fuel filter / separator- check/drain
- Exhaust system- inspect

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547) OR the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 0312-3893)

**Deutz 2011 Series Operation Manual**

Genie part number 139320

**Deutz 2.9 L4 Series Operation Manual**

Genie part number 1251561

**A-7****Inspect the Track Components, TRAX option**

Note: Genie specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Maintaining tracks and track assembly components is essential to safe operation and good performance. A track assembly failure could result in a machine tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion.

- 1 Thoroughly clean the track assembly of any dirt, rocks, clay, etc.
- 2 Inspect the following areas for damaged, cracked, loose or missing parts and fasteners:
  - Track
  - Idler wheels
  - Drive sprocket and hub
  - Bogey wheels
  - Undercarriage
  - Kingpin and steering linkage bushings



## CHECKLIST A PROCEDURES

## A-8 Check the High Pressure Hydraulic Filter Condition Indicator

Genie specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Maintaining the high pressure hydraulic filter in good condition is essential to good system performance and safe machine operation. The filter condition indicator will show when the hydraulic flow is bypassing a clogged filter. If the filter is not frequently checked and replaced, impurities will remain in the hydraulic system and cause component damage.

- 1 Open the engine side turntable cover.
  - 2 Start the engine from the ground controls.
  - 3 Change the engine idle to high rpm (rabbit symbol).
  - 4 Visually inspect the filter condition indicator.
- ⦿ Result: The filter condition indicator should be operating with the plunger in the green area.
  - ✗ Result: If the indicator displays the plunger in the red area, this indicates that the hydraulic filter is being bypassed and the filter should be replaced. See D-6, *Replace the Hydraulic Filters*.

## A-9 Test the Oscillate Axle (if equipped)



Genie specifications require that this procedure be performed daily or every 8 hours, whichever comes first.

Proper axle oscillation is essential to safe machine operation. If the axle oscillation system is not operating correctly, the stability of the machine is compromised and it may tip over.

- 1 Start the engine from the platform controls.
- 2 Drive the right steer tire up onto a 6 inch / 15 cm block or curb.
- ⦿ Result: The three remaining tires should stay in firm contact with the ground and the chassis should remain level at all times.
- 3 Drive the left steer tire up onto a 6 inch / 15 cm block or curb.
- ⦿ Result: The three remaining tires should stay in firm contact with the ground and the chassis should remain level at all times.
- 4 Drive both steer tires up onto a 6 inch / 15 cm block or curb.
- ⦿ Result: The non-steer tires should stay in firm contact with the ground.

Note: If the chassis does not remain level during test, refer to Repair Procedure 8-5, *How to Set Up the Directional Valve Linkage*.

## CHECKLIST A PROCEDURES

**A-10****Perform 30 Day Service**

The 30 day maintenance procedure is a one time sequence of procedures to be performed after the first 30 days or 40 hours of usage, whichever comes first. After this interval, refer to the maintenance checklist for continued scheduled maintenance.

1 Perform the following maintenance procedures:

- A-15 Grease the Turntable Rotation Bearing and Rotate Gear
- B-6 Inspect the Tires, Wheels and Lug Nut Torque
- D-2 Check the Turntable Rotation Bearing Bolts
- D-4 Replace the Drive Hub Oil
- D-6 Replace the Hydraulic Filters

**A-11****Replace the Drive Hub Oil**

Manufacturer drive hub specifications require that this one-time procedure be performed after the first 50 hours.

Replacing the drive hub oil is essential for good machine performance and service life. Failure to replace the drive hub oil after the first 150 hours of use may cause the machine to perform poorly and continued use may cause component damage.

- 1 Select the drive hub to be serviced. Drive the machine until one of the two plugs is at the lowest point.
- 2 Remove both plugs and drain the oil into a suitable container.
- 3 Drive the machine until both plugs are horizontal.
- 4 Fill the hub until the oil level is even with the bottom of the plug hole. Refer to Section 2, *Specifications*.
- 5 Install the plugs into the drive hub.
- 6 Repeat this procedure for the other drive hub.

## CHECKLIST A PROCEDURES

**A-12****Perform Engine Maintenance -  
Ford Models**

The 50 hour maintenance procedure is a one time sequence of procedures to be performed after the first 30 days of usage. After this interval, refer to the maintenance tables for continued scheduled maintenance.

- Oil, coolant, fuel, exhaust and vacuum hoses - check for leaks, damage or deterioration
- Electrical wiring - check for chafing or damage

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (EDI part number 1020010)

**Ford MSG 425 EFI Operator Handbook**

Genie part number	215322
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**A-13****Perform Engine Maintenance -  
Perkins Models**

Engine specifications require that this procedure be every 50 hours or weekly, whichever comes first.

Proper engine maintenance, following the engine manufacturer's maintenance schedule, is essential to good engine performance and service life. Failure to perform the maintenance procedures can lead to poor engine performance and component damage.

- Fuel pre-filter/water separator- drain

*Perkins 400 Series Operation Manual*  
(Perkins part number TPD 1443S) OR the  
*Perkins 404F Series Operation Manual*  
(Perkins part number SEBU8609).

**Perkins 400 Series Operation Manual**

Genie part number	94890
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**Perkins 404F Series Operation Manual**

Genie part number	1251562
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## CHECKLIST A PROCEDURES

**A-14****Perform Engine Maintenance - Ford Models**

Engine specifications require that this procedure be performed every 100 hours. Perform this procedure more often if dusty conditions exist or the machine is subjected to extended low idle operation.

- Oil, coolant, fuel, exhaust and vacuum hoses - check for leaks, damage or deterioration
- Electrical wiring - check for chafing or damage

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (EDI part number 1020010)

**Ford MSG 425 EFI Operator Handbook**

Genie part number

215322

**To access the engine:**

- 1 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

- 2 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.

**A-15****Grease the Turntable Rotation Bearing and Rotate Gear**

Genie specifications require that this procedure be performed every 100 hours of operation. Perform this procedure more often if dusty conditions exist.

Frequent application of lubrication to the turntable bearing and rotate gear is essential to good machine performance and service life. Continued use of an improperly greased bearing and gear will result in component damage.

- 1 Locate the grease fitting near the ground control box.
- 2 Pump grease into the turntable rotation bearing. Rotate the turntable in increments of 4 to 5 inches / 10 to 13 cm at a time and repeat this step until the entire bearing has been greased.
- 3 Apply grease to each tooth of the drive gear, located under the turntable.

**Grease Specification**

Chevron Ultra-duty grease, EP NLGI 2 (lithium based) or equivalent

## A-16

### Perform Engine Maintenance - Ford Models



Engine specifications require that this procedure be performed every 200 hours.

- Engine belts - check/adjust
- Fuel filters - check/replace

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (Ford part number 1020010)

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**Ford MSG-425 EFI Operator Handbook**

Genie part number

215322

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**To access the engine:**

- 1 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

- 2 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.

# Checklist B Procedures

## B-1

### Inspect the Battery



Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper battery condition is essential to good engine performance and operational safety. Improper fluid levels or damaged cables and connections can result in engine component damage and hazardous conditions.

**⚠ WARNING** Electrocuting/burn hazard. Contact with hot or live circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

**⚠ WARNING** Bodily injury hazard. Batteries contain acid. Avoid spilling or contacting battery acid. Neutralize battery acid spills with baking soda and water.

- 1 Open the side covers.
- 2 Be sure that the battery cable connections are free of corrosion.

Note: Adding terminal protectors and a corrosion preventative sealant will help eliminate corrosion on the battery terminals and cables.

- 3 Be sure that the battery retainers and cable connections are tight.
- 4 Fully charge the batteries. Allow the batteries to rest 24 hours before performing this procedure to allow the battery cells to equalize.
- 5 Put on protective clothing and eye wear.
- 6 Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer. Note the results.
- 7 Check the ambient air temperature and adjust the specific gravity reading for each cell as follows:
  - Add 0.004 to the reading of each cell for every 10° / 5.5° C above 80° F / 26.7° C.
  - Subtract 0.004 from the reading of each cell for every 10° / 5.5° C below 80° F / 26.7° C.
- ⊙ Result: All battery cells display an adjusted specific gravity of 1.277 +/- 0.007. The battery is fully charged. Proceed to step 11.
- ✗ Result: One or more battery cells display a specific gravity of 1.269 or below. Proceed to step 8.
- 8 Perform an equalizing charge OR fully charge the batteries and allow the batteries to rest at least 6 hours.
- 9 Remove the battery vent caps and check the specific gravity of each battery cell with a hydrometer. Note the results.

## CHECKLIST B PROCEDURES

10 Check the ambient air temperature and adjust the specific gravity reading for each cell as follows:

- Add 0.004 to the reading of each cell for every 10° / 5.5° C above 80° F / 26.7° C.
  - Subtract 0.004 from the reading of each cell for every 10° / 5.5° C below 80° F / 26.7° C.
  - ⦿ Result: All battery cells display a specific gravity of 1.277 +/- 0.007. The battery is fully charged. Proceed to step 11.
  - ✗ Result: One or more battery cells display a specific gravity from 1.269 to 1.218. The battery is still useable, but at a lower performance so will need to be recharged more often. Proceed to step 11.
  - ✗ Result: One or more battery cells display a specific gravity from 1.217 to 1.173. The battery is approaching the end of its life. Proceed to step 11.
  - ✗ Result: The difference in specific gravity readings between cells is greater than 0.1 OR the specific gravity of one or more cells is 1.172 or less. Replace the battery.
- 11 Check the battery acid level. If needed, replenish with distilled water to 1/8 inch / 3 mm below the bottom of the battery fill tube. Do not overfill.
- 12 Install the vent caps and neutralize any electrolyte that may have spilled.

**B-2****Inspect the Electrical Wiring**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining electrical wiring in good condition is essential to safe operation and good machine performance. Failure to find and replace burnt, chafed, corroded or pinched wires could result in unsafe operating conditions and may cause component damage.

**⚠ WARNING**

Electrocution/burn hazard. Contact with hot or live circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

- 1 Open the engine side turntable cover.
- 2 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

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**CHECKLIST B PROCEDURES**

- 3 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.
- 4 Inspect the following areas for burnt, chafed, corroded and loose wires:
  - Engine wiring harness
  - Hydraulic manifold wiring
- 5 Open the ground controls side turntable cover.
- 6 Inspect the following areas for burnt, chafed, corroded and loose wires:
  - Ground control box wire harnesses
  - Inside of the ground control box
  - Hydraulic manifold wiring
- 7 Inspect for a liberal coating of dielectric grease at the following location:
  - All wire harnesses connectors to the ground control box
- 8 Start the engine from the ground controls and raise the secondary boom above the turntable covers.
- 9 Remove the center turntable cover retaining fasteners. Remove the center turntable cover from the machine.
- 10 Inspect the turntable area for burnt, chafed and pinched cables.
- 11 Lower the boom to the stowed position and turn the engine off.
- 12 Inspect the following areas for burnt, chafed, corroded, pinched and loose wires:
  - Cable track on the primary boom
  - Cables on the primary, and jib booms
  - Jib boom/Platform rotate manifold
  - Inside of the platform control box
- 13 Inspect for a liberal coating of dielectric grease at the following location:
  - All wire harnesses connectors to the platform control box
- 14 Swing the engine back to its original position and close the engine pivot plate latch.
- 15 Install the engine pivot plate safety pin.
- 16 Install the center turntable cover and tighten the retaining fasteners.



## CHECKLIST B PROCEDURES

## B-3 Check the Exhaust System

Engine specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining the exhaust system is essential to good engine performance and service life. Running the engine with a damaged or leaking exhaust system can cause component damage and unsafe operating conditions.

**⚠ WARNING** Bodily injury hazard. Do not inspect while the engine is running. Remove the key to secure from operation.

**⚠ CAUTION** Burn hazard. Beware of hot engine components. Contact with hot engine components may result in severe burns.

### Ford models:

- 1 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

- 2 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine to access the exhaust system.

### All models:

- 3 Be sure that all nuts and bolts are tight.
- 4 Inspect all welds for cracks.
- 5 Inspect for exhaust leaks; i.e., carbon buildup around seams and joints.

### Ford models:

- 6 Swing the engine back to its original position and close the engine pivot plate latch.
- 7 Install the engine pivot plate safety pin.

## CHECKLIST B PROCEDURES

**B-4****Perform Engine Maintenance - Perkins Models**

Engine specifications require that this procedure be performed every 250 hours.

Proper engine maintenance, following the engine manufacturer's maintenance schedule, is essential to good engine performance and service life. Failure to perform the maintenance procedures can lead to poor engine performance and component damage.

- Engine belts - check/adjust

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S).

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**Perkins 400 Series Operation Manual**

Genie part number

94890

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**B-5****Check the Oil Cooler and Cooling Fins - Deutz D2011L03i Models**

Engine specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining the oil cooler in good condition is essential for good engine performance. Operating a machine with a damaged oil cooler may result in engine damage. Also, restricting air flow through the oil cooler will affect the performance of the cooling system.

**⚠ WARNING**

Bodily injury hazard. Do not inspect while the engine is running. Remove the key to secure from operation.

**⚠ CAUTION**

Burn hazard. Beware of hot engine components. Contact with hot engine components may result in severe burns.

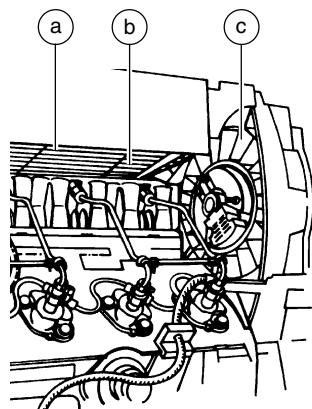
**Oil cooler:**

- 1 Remove the safety pin from the engine pivot plate latch.

Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.

## CHECKLIST B PROCEDURES

- 2 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.
- 3 Remove the fasteners from the engine side cover, then remove the cover.
- 4 Inspect the oil cooler for leaks and physical damage.



- a oil cooler  
b cylinder head cooling fins  
c fan blower fins

- 5 Clean the oil cooler of debris and foreign material.

**Cooling and fan blower fins:**

- 6 Inspect the fan blower fins for physical damage.
- 7 Clean the fan blower fins of debris and foreign material.
- 8 Inspect the head cooling passages and fins for physical damage or foreign material, using a flashlight.
- 9 Clean the cylinder head cooling passages of debris and foreign material.
- 10 Install the engine side cover.
- 11 Swing the engine back to its original position and close the engine pivot plate latch.
- 12 Install the engine pivot plate safety pin.

## CHECKLIST B PROCEDURES

**B-6****Inspect the Tires, Wheels and Lug Nut Torque**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Maintaining the tires and wheels, including proper wheel fastener torque, is essential to safe operation and good performance. Tire and/or wheel failure could result in a machine tip-over. Component damage may also result if problems are not discovered and repaired in a timely fashion.

**⚠ WARNING** Bodily injury hazard. An over-inflated tire can explode and could cause death or serious injury.

**⚠ WARNING** Tip-over hazard. Do not use temporary flat tire repair products.

Note: The tires on some machines are foam-filled and do not need air added to them.

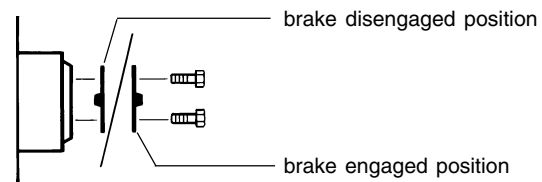
- 1 Check all tire treads and sidewalls for cuts, cracks, punctures and unusual wear.
- 2 Check each wheel for damage, bends and cracked welds.
- 3 Check each lug nut for proper torque. Refer to Section 2, *Specifications*.
- 4 Check the pressure in each air-filled tire. Refer to Section 2, *Specifications*.

**B-7****Confirm the Proper Brake Configuration**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper brake configuration is essential to safe operation and good machine performance. Hydrostatic brakes and hydraulically-released, spring-applied individual wheel brakes can appear to operate normally when they are actually not fully operational.

- 1 Check each drive hub disconnect cap to be sure it is in the engaged position.



## CHECKLIST B PROCEDURES

**B-8****Check the Drive Hub Oil Level and Fastener Torque**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Failure to maintain proper drive hub oil levels may cause the machine to perform poorly and continued use may cause component damage.

- 1 Drive the machine to rotate the hub until the plugs are located one on top and the other at 90 degrees.
- 2 Remove the plug located at 90 degrees and check the oil level.
- ⦿ Result: The oil level should be even with the bottom of the side plug hole.
- 3 If necessary, remove the top plug and add oil until the oil level is even with the bottom of the side plug hole.
- 4 Install the plug(s) into the drive hub.
- 5 Check the torque of the drive hub mounting bolts. Refer to Section 2, *Specifications*.
- 6 Repeat this procedure for each drive hub.

**B-9****Test the Ground Control Override**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

A properly functioning ground control override is essential to safe machine operation. The ground control override function is intended to allow ground personnel to operate the machine from the ground controls whether or not the red Emergency Stop button on the platform controls is in the on or off position. This function is particularly useful if the operator at the platform controls cannot return the boom to the stowed position.

- 1 Push in the platform red Emergency Stop button to the off position.
- 2 Start the engine from the ground controls.
- 3 At the ground controls, operate each boom function through a partial cycle.
- ⦿ Result: All boom functions should operate.

## CHECKLIST B PROCEDURES

**B-10****Check the Oscillate Directional Valve Linkage**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

**Note:** Perform this test only on models equipped with an oscillating axle.

Proper axle oscillation is essential to safe machine operation. If the oscillate directional valve linkage is not operating correctly, the stability of the machine is compromised and it may tip over.

- 1 Remove the drive chassis cover and the axle covers from the non-steer end of the drive chassis.
- 2 Locate the oscillate directional valve inside of the non-steer axle and inspect the linkage for the following:
  - Lock nut is tight against yoke
  - Yoke clevis pins are installed
  - Cotter pins are installed through clevis pins
  - Linkage is properly attached to directional valve

**B-11****Test the Platform Self-leveling**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Automatic platform self-leveling throughout the full cycle of boom raising and lowering is essential for safe machine operation. The platform is maintained at level by the platform leveling slave cylinder which operates in a closed loop hydraulic circuit with the master cylinder located at the base of the boom.

A platform self-leveling failure creates an unsafe working condition for platform and ground personnel.

- 1 Start the engine from the ground controls and lower the boom into the stowed position.
  - 2 Hold the function enable toggle switch to either side and adjust the platform to a level position using the platform level toggle switch.
  - 3 Raise and lower the primary boom through a full cycle.
- ⦿ **Result:** The platform should remain level at all times to within  $\pm 5$  degrees.

## CHECKLIST B PROCEDURES

**B-12****Test the Engine Idle Select**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

A properly operating engine idle select switch is essential to good engine performance and safe machine operation. There are two settings.

**Foot switch activated low idle** (turtle symbol) allows the operator to control individual boom functions. Drive functions will operate at low idle, but at reduced performance.

**Foot switch activated high idle** (rabbit symbol) should be used for normal machine operation. This selection activates high idle only when the foot switch is pressed down.

- 1 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.
- 2 Start the engine from the ground controls then move the function enable toggle switch to the high idle (rabbit symbol) position and hold in the on position.
  - ⦿ Result: The engine should change to high idle.
- 3 Release the function enable toggle switch.
  - ⦿ Result: The engine should return to low idle.

- 4 Turn the key switch to platform controls.
- 5 Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol).
  - ⦿ Result: The engine should not change to high idle.
- 6 Press down the foot switch.
  - ⦿ Result: The engine should change to high idle.
- 7 Move the engine idle control switch to foot switch activated low idle (turtle symbol).
  - ⦿ Result: The engine should change to low idle.

## CHECKLIST B PROCEDURES

**B-13****Test the Fuel Select Operation -  
Ford Models**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

The ability to select and switch between gasoline and LPG fuels as needed is essential to safe machine operation. A fuel selection can be made when the engine is running or not. Switching malfunctions and/or the failure of the engine to start and run properly in both fuel modes and through all idle speeds can indicate fuel system problems that could develop into a hazardous situation.

Note: Perform this test after checking the gasoline and LPG fuel levels, and warming the engine to normal operating temperature.

- 1 At the platform controls, move the fuel select switch to gasoline and then move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol).
- 2 Start the engine from the platform controls and allow it to run at low idle.

- 3 Press down the foot switch to allow the engine to run at high idle.
- ⊙ Result: The engine should start promptly and operate smoothly in low and high idle.
- 4 Release the foot switch and shut the engine off by pushing in the red Emergency Stop button in to the off position.
- 5 Move the fuel select switch to LPG.
- 6 Restart the engine and allow it to run at low idle.
- 7 Press down the foot switch to allow the engine to run at high idle.
- ⊙ Result: The engine should start promptly and operate smoothly in low and high idle.

Note: The engine may hesitate momentarily and then continue to run on the selected fuel if the fuel source is switched while the engine is running.



## CHECKLIST B PROCEDURES

**B-14****Test the Drive Brakes**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper brake action is essential to safe machine operation. The drive brake function should operate smoothly, free of hesitation, jerking and unusual noise. Hydrostatic brakes and hydraulically-released individual wheel brakes can appear to operate normally when they are actually not fully operational.

**⚠ WARNING** Collision hazard. Be sure that the machine is not in free-wheel or partial free-wheel configuration. See B-7, *Confirm the Proper Brake Configuration*.

Note: Select a test area that is firm, level and free of obstructions.

- 1 Mark a test line on the ground for reference.
- 2 Start the engine from the platform controls.
- 3 Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol), then lower the boom into the stowed position.

- 4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the test line.
- 5 Bring the machine to top drive speed before reaching the test line. Release the drive joystick when your reference point on the machine crosses the test line.
- 6 Measure the distance between the test line and your machine reference point. Refer to Section 2, *Specifications*.

Note: The brakes must be able to hold the machine on any slope it is able to climb.

## CHECKLIST B PROCEDURES

**B-15****Test the Drive Speed -  
Stowed Position**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper drive function movement is essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

**Note:** Select a test area that is firm, level and free of obstructions.

- 1 Create start and finish lines by marking two lines on the ground 40 feet / 12.2 m apart.
- 2 Start the engine from the platform controls.
- 3 Move the engine idle control switch to foot switch activated high idle (rabbit and foot switch symbol), then lower the boom into the stowed position.
- 4 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the start and finish lines.
- 5 Bring the machine to top drive speed before reaching the start line. Begin timing when your reference point on the machine crosses the start line.
- 6 Continue at full speed and note the time when the machine reference point crosses the finish line. Refer to Section 2, *Specifications*.

## CHECKLIST B PROCEDURES

**B-16****Test the Drive Speed -  
Raised or Extended Position**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Proper drive function movement is essential to safe machine operation. The drive function should respond quickly and smoothly to operator control. Drive performance should also be free of hesitation, jerking and unusual noise over the entire proportionally controlled speed range.

**Note:** Select a test area that is firm, level and free of obstructions.

- 1 Create start and finish lines by marking two lines on the ground 40 feet / 12.2 m apart.
- 2 Start the engine from the platform controls.
- 3 Move the engine idle select switch to foot switch activated high idle (rabbit and foot switch symbol).
- 4 Press down the foot switch and raise the primary boom above horizontal.
- 5 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the start and finish lines.
- 6 Bring the machine to top drive speed before reaching the start line. Begin timing when your reference point on the machine crosses the start line.
- 7 Continue at full speed and note the time when the machine reference point crosses the finish line. Refer to Section 2, *Specifications*.
- 8 Lower the boom to the stowed position and extend the boom 1 foot / 30 cm.
- 9 Choose a point on the machine; i.e., contact patch of a tire, as a visual reference for use when crossing the start and finish lines.
- 10 Bring the machine to top drive speed before reaching the start line. Begin timing when your reference point on the machine crosses the start line.
- 11 Continue at top speed and note the time when the machine reference point crosses the finish line. Refer to Section 2, *Specifications*.

## CHECKLIST B PROCEDURES

**B-17****Test the Alarm Package  
(if equipped)**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

The alarm package includes:

- Travel alarm
- Descent alarm
- Flashing beacon

Alarms and a beacon are installed to alert operators and ground personnel of machine proximity and motion. The alarm package is installed on the turntable covers.

Note: The alarms and beacon will operate with the engine running or not running.

- 1 Turn the key switch to ground control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.
  - ⦿ Result: The flashing beacon should be on and flashing.
- 2 Move the function enable switch to either side and activate the primary boom toggle switch in the down position, hold for a moment and then release it.
  - ⦿ Result: The descent alarm should sound when the switch is held down.
- 3 Move the function enable switch to either side and activate the secondary boom toggle switch in the down position, hold for a moment and then release it.
  - ⦿ Result: The descent alarm should sound when the switch is held down.
- 4 **S-45:** Move the function enable toggle switch to either side and activate the jib boom toggle switch in the down position, hold for a moment and then release it.
  - ⦿ Result: The descent alarm should sound when the switch is held down.
- 5 Turn the key switch to platform control.
  - ⦿ Result: The flashing beacon should be on and flashing.
- 6 Press down the foot switch. Move the primary boom control handle to the down position, hold for a moment and then release it.
  - ⦿ Result: The descent alarm should sound when the control handle is held down.
- 7 Press down the foot switch. Move the secondary boom control handle to the down position, hold for a moment and then release it.
  - ⦿ Result: The descent alarm should sound when the control handle is held down.

## CHECKLIST B PROCEDURES

- 8 **S-45:** Press down the foot switch. Activate the jib boom toggle switch in the down position, hold for a moment and then release it.
- ⦿ Result: The descent alarm should sound when the switch is held down.
- 9 Press down the foot switch. Move the drive control handle off center, hold for a moment and then release it. Move the drive control handle off center in the opposite direction, hold for a moment and then release it.
- ⦿ Result: The travel alarm should sound when the drive control handle is moved off center in either direction.

## B-18

### Perform Hydraulic Oil Analysis



Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Replacement or testing of the hydraulic oil is essential for good machine performance and service life. Dirty oil and a clogged suction strainer may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require oil changes to be performed more often. For hydraulic oil specifications, refer to Section 2, *Specifications*.

Note: Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary. **If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test.** See E-1, *Test or Replace the Hydraulic Oil*.

## CHECKLIST B PROCEDURES

**B-19****Inspect the Fuel and Hydraulic Tank Cap Venting Systems**

Genie requires that this procedure be performed every 250 hours or quarterly, whichever comes first. Perform this procedure more often if dusty conditions exist.

Free-breathing fuel and hydraulic tank caps are essential for good machine performance and service life. A dirty or clogged tank cap may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the caps be inspected more often.

**⚠ DANGER**

Explosion and fire hazard. Engine fuels are combustible. Perform this procedure in an open, well-ventilated area away from heaters, sparks, flames and lighted tobacco. Always have an approved fire extinguisher within easy reach.

Note: Perform this procedure with the engine off.

- 1 Remove the cap from the fuel tank.

- 2 Check for proper venting.

⦿ Result: Air passes through the fuel tank cap. Proceed to step 4.

✗ Result: If air does not pass through the cap, clean or replace the cap. Proceed to step 3.

**NOTICE**

When checking for positive tank cap venting, air should pass freely through the cap.

- 3 Using a mild solvent, carefully wash the cap venting system. Dry using low pressure compressed air. Repeat this procedure beginning with step 2.

- 4 Install the fuel tank cap onto the fuel tank.

- 5 Remove the breather cap from the hydraulic tank.

- 6 Check for proper venting.

⦿ Result: Air passes through the fuel tank cap. Proceed to step 8.

✗ Result: If air does not pass through the cap, clean or replace the cap. Proceed to step 7.

Note: When checking for positive tank cap venting, air should pass freely through the cap.

- 7 Using a mild solvent, carefully wash the cap venting system. Dry using low pressure compressed air. Repeat this procedure beginning with step 6.

- 8 Install the breather cap onto the hydraulic tank.

## CHECKLIST B PROCEDURES

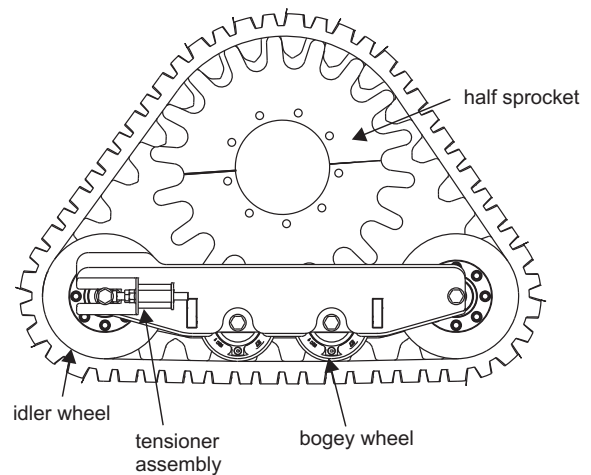
**B-20****Check the Track Tension and Fastener Torque, TRAX option**

Note: Manufacturer specifications require that this procedure be performed every 250 hours or quarterly.

Maintaining proper track tension and properly torqued fasteners is essential to good machine performance and service life. The machine will not operate properly with a track that is incorrectly tensioned. Continued use of a machine with incorrectly tensioned tracks may cause component damage.

- 1 Thoroughly clean the track assembly of any dirt, rocks, clay, etc.
- 2 Chock the tracks at one end of the machine to prevent the machine from rolling.
- 3 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the tracks at the other end of the machine.
- 4 Lift the machine until the tracks are off the ground and then place jack stands under the drive chassis for support.

- 5 Visually inspect the section of track under the bogey wheels.
  - Result: There should be between 0.75 - 1 inch / 1.9 - 2.5 cm of gap between the bogey wheels and the inside surface of the track. Proceed to step 7.
  - ✗ Result: There is 1 inch / 2.5 cm or more of gap between the bogey wheels and the inside surface of the track. Proceed to step 6.



## CHECKLIST B PROCEDURES

- 6 Loosen the tensioner jam nut and idler axle bolts on both sides of the tensioner wheel and tighten the tensioner nut until there is between 0.75 - 1 inch / 1.9 - 2.5 cm of gap between the bogey wheels and the inside surface of the track.

**NOTICE**

Component damage hazard.  
Do not over tighten the track.  
Overtightening the track will cause the machine to lose power during operation.

- 7 Tighten the jam nut.
- 8 Check the torque of the track assembly fasteners. Refer to Section 2, *Specifications*.
- 9 Raise the machine, remove the jack stands and lower the machine.
- 10 Repeat this procedure for each track assembly.

**B-21****Test the Emergency Power System**

Genie specifications require that this procedure be performed every 250 hours or quarterly, whichever comes first.

Testing the emergency power system regularly is essential to safe machine operation if the primary power source fails.

Note: Perform this procedure with the engine off.

- 1 Turn the key switch to ground control and pull out the red Emergency Stop button to the on position at both the ground and platform controls.
- 2 At the ground controls, break the security tie and lift the emergency power switch cover (if equipped).
- 3 Simultaneously hold the emergency power switch on and activate each boom function toggle switch.

Note: To conserve battery power, test each function through a partial cycle.

- ⦿ Result: All boom functions operate.
- 4 Close the emergency power switch cover and secure the cover with a security tie (if equipped).



## CHECKLIST B PROCEDURES

- 5 Turn the key switch to platform controls.
- 6 At the platform controls, break the security tie and lift the emergency power switch cover (if equipped).
- 7 Press down the foot switch and simultaneously hold the emergency power switch on and activate each boom function.

Note: To conserve battery power, test each function through a partial cycle.

- ⦿ Result: All boom functions operate.
- 8 Close the emergency power switch cover and secure the cover with a security tie (if equipped).

**B-22****Perform Engine Maintenance - Ford Models**

Engine specifications require that this procedure be performed every 400 hours.

- Engine oil - replace
- Oil filter - replace
- Spark plugs - clean/adjust/replace
- Loose or missing fasteners - tighten/replace

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (Ford part number 1020010)

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**Ford MSG-425 EFI Operator Handbook**

Genie part number

215322

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# Checklist C Procedures

## C-1

### Grease the Platform Overload Mechanism (if equipped)



Genie specifications require that this procedure be performed every 500 hours or 6 months, whichever comes first. Perform this procedure more often if dusty conditions exist.

Application of lubrication to the platform overload mechanism is essential to safe machine operation. Continued use of an improperly greased platform overload mechanism could result in the system not sensing an overloaded platform condition and will result in component damage.

- 1 Locate the grease fittings on each pivot pin of the platform overload assembly.
- 2 Thoroughly pump grease into each grease fitting.

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#### Grease Specification

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Chevron Ultra-duty grease, EP NLGI 2 (lithium based) or equivalent

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## C-2

### Test the Platform Overload System (if equipped)



Genie specifications require that this procedure be performed every 500 hours or six months, whichever comes first.

Testing the platform overload system regularly is essential to safe machine operation. Continued use of an improperly operating platform overload system could result in the system not sensing an overloaded platform condition. Machine stability could be compromised resulting in the machine tipping over.

**Note:** Perform this procedure with the machine on a firm, level surface.

- 1 Turn the key switch to platform control. Start the engine and level the platform.
- 2 Determine the maximum platform capacity. Refer to the machine serial plate.
- 3 Remove all weight, tools and accessories from the platform.

**Note:** Failure to remove all weight, tools and accessories from the platform will result in an inaccurate test.

## CHECKLIST C PROCEDURES

- 4 Using a suitable lifting device, place a test weight equal to that of the available capacity at one of the locations shown. Refer to Illustration 1.

⊙ Result: The platform overload indicator lights should be off at both the ground and platform controls and the alarm should not sound.

✗ Result: The platform overload indicator lights are on and the alarm is sounding. Calibrate the platform overload system. Refer to Repair Procedure 2-4, *How to Calibrate the Platform Overload System (if equipped)*.

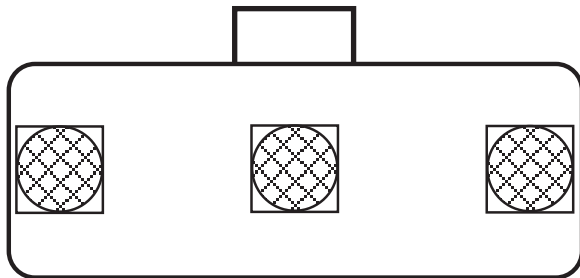


Illustration 1

- 5 Carefully move the test weight to each remaining location. Refer to Illustration 1.

⊙ Result: The platform overload indicator lights should be off at both the ground and platform controls and the alarm should not sound.

✗ Result: The platform overload indicator lights are on and the alarm is sounding. Calibrate the platform overload system. Refer to Repair Procedure 2-4, *How to Calibrate the Platform Overload System (if equipped)*.

- 6 Using a suitable lifting device, place an additional 50 lbs / 23 kg of weight onto the platform.

⊙ Result: The alarm should sound and the engine should shut off. The platform overload indicator lights should be flashing at both the ground and platform controls.

✗ Result: The alarm does not sound, the engine does not shut off and the platform overload indicator lights are not flashing. Calibrate the platform overload system. Refer to Repair Procedure 2-4, *How to Calibrate the Platform Overload System (if equipped)*.

Note: There may be a 2 second delay before the overload indicator lights flash, the alarm sounds and the engine shuts off.

- 7 Using a suitable lifting device, remove the test weights, restart the engine and carefully move the test weights to each remaining location on the platform. Refer to Illustration 1.

⊙ Result: The alarm should sound, the engine should shut off and the platform overload indicator lights should be flashing at both the ground and platform controls.

✗ Result: The alarm does not sound and the platform overload indicator lights are not flashing. Calibrate the platform overload system. Refer to Repair Procedure 2-4, *How to Calibrate the Platform Overload System (if equipped)*.

Note: There may be a 2 second delay before the overload indicator lights flash, the alarm sounds and the engine shuts off.

## CHECKLIST C PROCEDURES

8 Test all machine functions from the platform controls.

⦿ Result: All platform control functions should not operate.

9 Turn the key switch to ground control.

10 Test all machine functions from the ground controls.

⦿ Result: All ground control functions should not operate.

11 Activate the auxiliary power toggle switch.

12 Using auxiliary power, test all machine functions from the ground controls.

⦿ Result: All ground control functions should operate.

13 Using a suitable lifting device, lift the additional test weight from the platform.

⦿ Result: The platform overload indicator lights should turn off at both the ground and platform controls and the alarm should not sound.

14 Start the engine and test all machine functions from the ground controls.

⦿ Result: All ground control functions should operate normally.

15 Turn the key switch to platform control.

16 Test all machine functions from the platform controls.

⦿ Result: All platform control functions should operate.

Note: If the platform overload system is not operating properly, Refer to Repair Procedure 2-4, *How to Calibrate the Platform Overload System (if equipped)*.

17 Push in the red Emergency stop button at the platform to shut off engine.

18 Using a suitable lifting device, remove all test weights from the platform.

19 Pull out the red Emergency stop button to the on position at the platform controls.

20 Remove the fasteners securing the lid to the platform controls. Using Illustration 2 as a guide, locate the timer relay inside the platform control box. Tag and disconnect the red wire from terminal 5 on the timer relay.

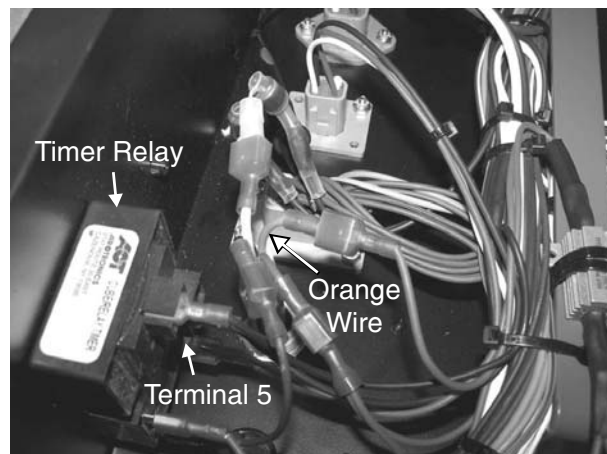


Illustration 2

## CHECKLIST C PROCEDURES

- 21 Using Illustration 3 as a guide, locate D31 Valve Power LED on the ALC500 printed circuit board.

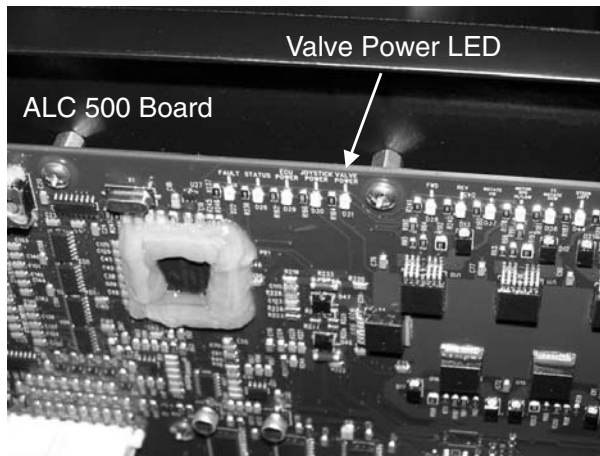


Illustration 3

- 22 Step on the footswitch at the platform.

- ⦿ Result: The Valve Power LED should not illuminate.
- ✗ Result: The Valve Power LED is illuminated. Remove the machine from service and contact the Genie Service Department.

- 23 Securely install the red wire, disconnected in step 20, onto terminal 5 of the relay timer.

- 24 Step on the footswitch at the platform.

- ⦿ Result: The Valve Power LED should illuminate.
- ✗ Result: The Valve Power LED is not illuminated. Remove the machine from service and contact the Genie Service Department.

- 25 Using a suitable lifting device, place a test weight equal to that of the available capacity at the center location shown in Illustration 1.

- 26 Using a suitable lifting device, place an additional 50 lbs / 23 kg of weight onto the platform.

- ⦿ Result: The alarm should sound and the Valve Power LED should not light. The platform overload indicator lights should be flashing at both the ground and platform controls.

- 27 Working from outside the platform and standing next to the platform rotator, locate the orange wire, which enters into the base of the platform control box from the load sense switch and locate the wire terminal at the end of the wire. Tag and disconnect the connectors. Refer to Illustration 2.

- 28 Using a multimeter set to read resistance (ohms), securely install a lead from the multimeter to the connector on the orange wire, and securely connect the other multimeter lead to a ground point in the control box.

- ⦿ Result: The readout on the multimeter should indicate zero resistance.

- ✗ Result: The readout on the multimeter shows resistance. Remove the machine from service and contact the Genie Service Department.

## CHECKLIST C PROCEDURES

29 Using a suitable lifting device, remove all weight from the platform. Note the result on the multimeter.

⦿ Result: The readout on the multimeter should indicate infinite resistance.

✗ Result: The readout on the multimeter shows zero resistance. Remove the machine from service and contact the Genie Service Department.

31 Turn off the multimeter and remove the leads from the machine. Securely connect the wires disconnected in step 27.

32 Close the platform control box. Install and securely tighten the fasteners. Do not overtighten.

**C-3****Replace the Engine Air Filter Element**

Genie specifications requires that this procedure be performed every 500 hours or 6 months, whichever comes first.

Maintaining the engine air filter in good condition is essential to good engine performance and service life. Failure to perform this procedure can lead to poor engine performance and component damage.

- 1 Open the evacuator valve located on the air cleaner cap by squeezing the sides together with your fingers.
- 2 Disconnect the latches on the air cleaner cap. Remove the end cap from the air cleaner canister.
- 3 Remove the filter element.
- 4 Clean the inside of the canister and the gasket with a damp cloth.
- 5 Install the new filter element.
- 6 Install the end cap on the canister and re-connect the latches.

Note: Be sure the evacuator valve is pointing down.

## CHECKLIST C PROCEDURES

**C-4****Perform Engine Maintenance - Perkins Models**

Engine specifications require that this procedure be performed every 500 hours.

**404D Model:**

- Primary fuel filter- replace
- Secondary fuel filter- replace

**404F Model:**

- Secondary fuel filter- replace
- In-line fuel filter- replace

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

<b>Perkins 400 Series Operation Manual</b>	
Genie part number	94890
<b>Perkins 404F Series Operation Manual</b>	
Genie part number	1251562

**C-5****Perform Engine Maintenance - Perkins Models**

Engine specifications require that this procedure be performed every 500 hours or annually, whichever comes first..

**All Models:**

- Engine coolant- test/add
- Engine oil- replace
- Oil filter- replace
- Hoses and clamps- inspect/replace
- Radiator- clean

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

<b>Perkins 400 Series Operation Manual</b>	
Genie part number	94890
<b>Perkins 404F Series Operation Manual</b>	
Genie part number	1251562

## CHECKLIST C PROCEDURES

## C-6

### Perform Engine Maintenance - Deutz Models



Engine specifications require that this procedure be performed every 500 hours.

#### All models:

- Engine oil- replace
- Oil filter- replace

#### D 2.9 L4 Models:

- Engine coolant- test/add
- Air intake pipes- inspect
- V-belts- inspect
- Fuel filter / separator- replace

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547) OR the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 3012-3893)

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#### Deutz 2011 Series Operation Manual

Genie part number 139320

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#### Deutz 2.9 L4 Series Operation Manual

Genie part number 1251561

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## C-7

### Check and Adjust the Engine RPM



Genie specifications require that this procedure be performed every 500 hours.

Maintaining the engine rpm at the proper setting for both low and high idle is essential to good engine performance and service life. The machine will not operate properly if the rpm is incorrect and continued use may cause component damage.

Note: This procedure will require two people.

#### Ford MSG-425 Models

#### Deutz D 2.9 L4 Models

#### Perkins 404F-22 Models

Not applicable to these models.

Note: The engine rpm is controlled by the ECM and can only be adjusted by re-programming the ECM. If rpm adjustment or service is required, please contact Genie Service Department.

#### Deutz D2011L03i Models

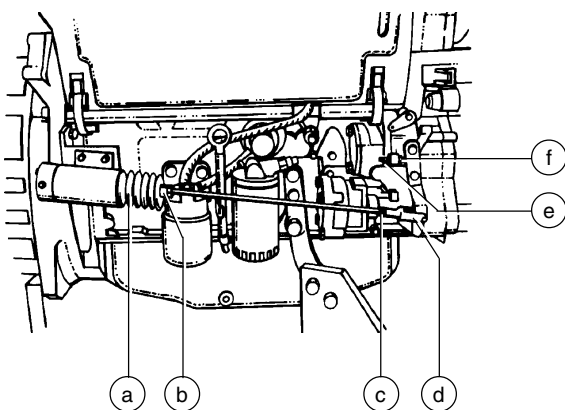
- 1 Connect a tachometer to the engine. Start the engine from the ground controls. Refer to Section 2, *Specifications*.



## CHECKLIST C PROCEDURES

**Skip to step 3 if the low idle rpm is correct.**

- 2 Loosen the low idle lock nut and turn the low idle adjustment screw clockwise to increase the rpm or counterclockwise to decrease the rpm. Tighten the low idle lock nut and re-check the rpm.
- 3 Move the function enable/rpm select toggle switch to the high idle (rabbit symbol) position at the ground controls. Refer to Section 2, *Specifications*.



- a solenoid boot
- b high idle adjustment nut
- c yoke lock nut
- d yoke
- e low idle adjustment screw
- f low idle lock nut

**If high idle rpm is correct, disregard adjustment step 4.**

- 4 Loosen the yoke lock nut. Turn the high idle adjustment nut and solenoid boot counterclockwise to increase the rpm or clockwise to decrease the rpm. Tighten the yoke lock nut and re-check the rpm.

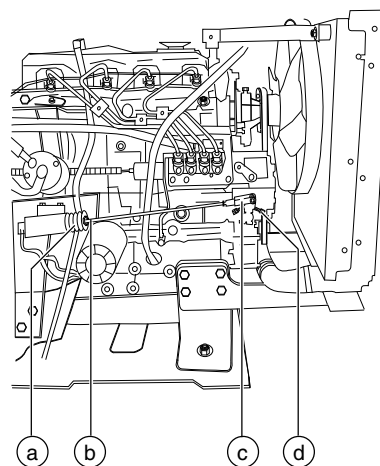
Note: Be sure the solenoid fully retracts when activating high idle.

#### Perkins 404D-22 Models

- 1 Connect a tachometer to the engine. Start the engine from the ground controls. Refer to Section 2, *Specifications*.

**Skip to step 3 if the low idle rpm is correct.**

- 2 Loosen the low idle lock nut. Turn the low idle adjustment screw clockwise to increase the rpm, or counterclockwise to decrease the rpm. Tighten the low idle lock nut and confirm the rpm.



- a solenoid boot
- b high idle adjustment nut
- c clevis
- d low idle lock nut and adjustment screw

## CHECKLIST C PROCEDURES

- 3 Move the function enable toggle switch to the high idle (rabbit symbol) position. Refer to Section 2, *Specifications*.

**If high idle rpm is correct, disregard adjustment step 4.**

- 4 Loosen the yoke lock nut. Turn the high idle adjustment nut and solenoid boot counterclockwise to increase the rpm or clockwise to decrease the rpm. Tighten the yoke lock nut and re-check the rpm.

Note: Be sure the solenoid fully retracts when activating high idle.

## C-8 Perform Engine Maintenance - Ford Models



Engine specifications require that this procedure be performed every 800 hours.

- PCV valve - inspect
- PCV hoses, tubes and fittings - clean

Required maintenance procedures and additional engine information are available in the *Ford MSG-425 EFI Operator Handbook* (Ford part number 1020010)

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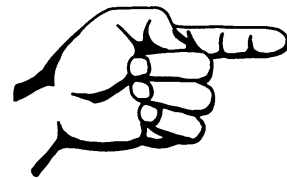
**Ford MSG-425 EFI Operator Handbook**

Genie part number

215322

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CHECKLIST C PROCEDURES



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# Checklist D Procedures

## D-1

### Check the Boom Wear Pads



Genie specifications requires that this procedure be performed every 1000 hours or annually, whichever comes first.

Maintaining the boom wear pads in good condition is essential to safe machine operation. Wear pads are placed on boom tube surfaces to provide a low friction, replaceable wear pad between moving parts. Improperly shimmed wear pads or continued use of extremely worn wear pads may result in component damage and unsafe operating conditions.

- 1 Start the engine from the ground controls.
- 2 Raise the end of the primary boom to a comfortable working height (chest high), then extend the boom 1 foot / 30 cm.
- 3 Measure each wear pad. Replace the wear pad once it reaches the minimum allowable thickness. If the wear pad is still within specification, shim as necessary to obtain minimum clearance with zero binding.

Note: The minimum shim clearance for primary boom wear pads is 0.070 inch / 1.8 mm and the maximum allowable shim clearance is 0.188 inch / 4.8 mm.

#### Wear pad specifications

#### Minimum

all wear pads	<sup>9</sup> / <sub>16</sub> inch 14.3 mm
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- 4 Extend and retract the boom through the entire range of motion to check for tight spots that may cause binding or scraping of the boom.

Note: Always maintain squareness between the outer and inner boom tubes.

## CHECKLIST D PROCEDURES

**D-2****Check the Turntable Rotation Bearing Bolts**

Genie specifications requires that this procedure be performed every 1000 hours or annually, whichever comes first.

Maintaining proper torque on the turntable bearing bolts is essential to safe machine operation. Improper bolt torque could result in an unsafe operating condition and component damage.

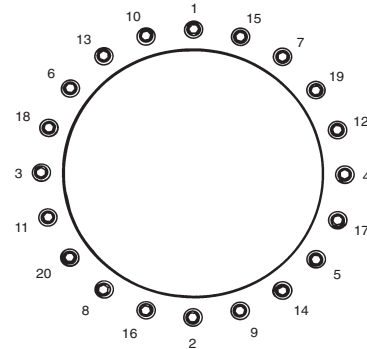
- 1 Raise the primary boom and place safety chocks on the lift cylinders rods. Carefully lower the boom onto the lift cylinders safety chocks.

**WARNING** Crushing hazard. Keep hands away from cylinders and all moving parts when lowering the boom.

Note: The lift cylinder safety chock is available through Genie (Genie part number 75097).

- 2 Turn the engine off.
- 3 Remove the engine tray retaining fasteners located under the engine tray. Swing the engine tray out and away from the machine and secure it from moving.

**WARNING** Crushing hazard. Failure to secure the engine pivot plate from moving could result in death or serious injury.

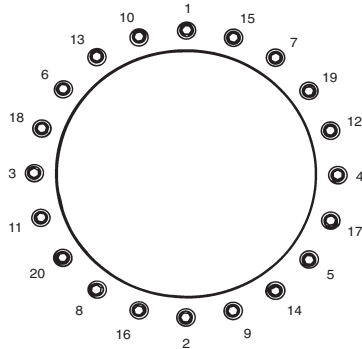


Bolt torque sequence

- 4 Be sure that each turntable mounting bolt is torqued in sequence to specifications. Refer to Section 2, *Specifications*.
- 5 Start the engine from the ground controls.
- 6 Raise the secondary boom and remove the safety chock.
- 7 Lower the boom to the stowed position.
- 8 Remove drive chassis covers from both the steer end and the non-steer end of the machine.

## CHECKLIST D PROCEDURES

- 9 Check to ensure that each lower bearing mounting bolt under the drive chassis is torqued in sequence to specifications. Refer to Section 2, *Specifications*.



Bolt torque sequence

- 10 Swing the engine back to its original position and install the engine pivot plate retaining fasteners.

**WARNING** Crushing hazard. Failure to install the fasteners into the engine tray to secure it from moving could result in death or serious injury.

### D-3 Inspect for Turntable Bearing Wear



Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Periodic inspection of turntable bearing wear is essential to safe machine operation, good machine performance and service life. Continued use of a worn turntable bearing could create an unsafe operating condition, resulting in death or serious injury and component damage.

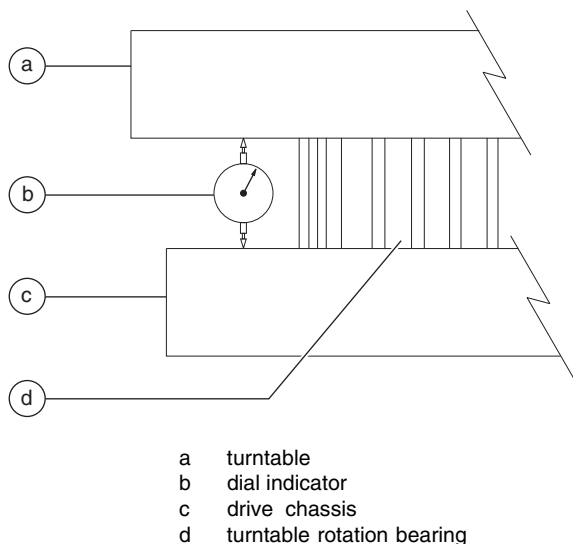
**Note:** Perform this procedure with the machine on a firm, level surface and the boom in the stowed position.

- 1 Grease the turntable bearing. See A-14, *Grease the Turntable Bearing and Rotate Gear*.
- 2 Torque the turntable bearing bolts to specification. See D-2, *Check the Turntable Rotation Bearing Bolts*.
- 3 Start the machine from the ground controls and raise the primary and secondary booms to full height. Do not extend the primary boom.

## CHECKLIST D PROCEDURES

- 4 Place a dial indicator between the drive chassis and the turntable at a point that is directly under, or inline with, the boom and no more than 1 inch / 2.5 cm from the bearing.

Note: To obtain an accurate measurement, place the dial indicator no more than 1 inch / 2.5 cm from the turntable rotation bearing.



- 5 At the dial indicator, adjust it to "zero" the indicator.

- 6 Lower the secondary boom to the stowed position and lower the primary boom to a horizontal position. Fully extend the primary boom.

- 7 Note the reading on the dial indicator.

☉ Result: The measurement is less than 0.063 inch / 1.6 mm. The bearing is good.

✗ Result: The measurement is more than 0.063 inch / 1.6 mm. The bearing is worn and needs to be replaced.

- 8 Fully retract the primary boom. Raise the primary and secondary booms to full height. Visually inspect the dial indicator to be sure the needle returns to the "zero" position.

- 9 Remove the dial indicator and rotate the turntable 90°.

- 10 Repeat steps 4 through 9 until the rotation bearing has been checked in at least four equally spaced areas 90° apart.

- 11 Lower the primary and secondary booms to the stowed position and turn the machine off.

- 12 Remove the dial indicator from the machine.

## CHECKLIST D PROCEDURES

**D-4****Replace the Drive Hub Oil**

Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Replacing the drive hub oil is essential for good machine performance and service life. Failure to replace the drive hub oil at yearly intervals may cause the machine to perform poorly and continued use may cause component damage.

- 1 Select the drive hub to be serviced. Then drive the machine until one of the two plugs is at the lowest point.
- 2 Remove both plugs and drain the oil.
- 3 Drive the machine until one plug is at the top and the other is at 90 degrees.
- 4 Fill the hub with oil from the top hole until the oil level is even with the bottom of the side hole. Install the plugs.
- 5 Repeat steps 1 through 4 for all the other drive hubs.
- 6 Check the torque of the drive hub mounting bolts. Refer to Section 2, *Specifications*.

**D-5****Check the Free-wheel Configuration**

Genie specifications require that this procedure be performed every 1000 hours or annually, whichever comes first.

Proper use of the free-wheel configuration is essential to safe machine operation. The free-wheel configuration is used primarily for towing. A machine configured to free-wheel without operator knowledge may cause death or serious injury and property damage.

**⚠ WARNING**

Collision hazard. Select a work site that is firm and level.

**NOTICE**

Component damage hazard. If the machine must be towed, do not exceed 2 mph / 3.2 km/h.

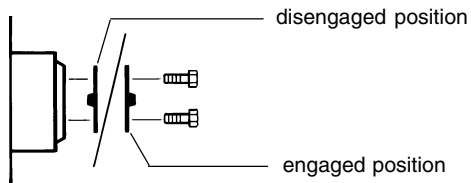
**Non-steer wheels: All models**

- 1 Chock the steer wheels to prevent the machine from rolling.
- 2 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the non-steer tires.



## CHECKLIST D PROCEDURES

- 3 Lift the wheels off the ground and then place jack stands under the drive chassis for support.
- 4 Disengage the drive hubs by turning over the drive hub disconnect caps on each non-steer wheel hub.



- 5 Manually rotate each non-steer wheel.
- ⊙ Result: Each non-steer wheel should rotate with minimum effort.
- 6 Re-engage the drive hubs by turning over the hub disconnect caps. Rotate each wheel to check for engagement. Raise the machine, remove the jack stands and lower the machine.

**⚠ WARNING** Collision hazard. Failure to re-engage the drive hubs could result in death or serious injury and property damage.

**Steer wheels: 4WD models**

- 7 Chock the non-steer wheels to prevent the machine from rolling.
- 8 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the steer tires.
- 9 Lift the wheels off the ground and then place jack stands under the drive chassis for support.
- 10 Disengage the drive hubs by turning over the drive hub disconnect caps on each steer wheel hub.
- 11 Manually rotate each steer wheel.
- ⊙ Result: Each steer wheel should rotate with minimum effort.
- 12 Re-engage the drive hubs by turning over the hub disconnect caps. Rotate each wheel to check for engagement. Raise the machine, remove the jack stands and lower the machine.

**⚠ WARNING** Collision hazard. Failure to re-engage the drive hubs could result in death or serious injury and property damage.

## CHECKLIST D PROCEDURES

**D-6****Replace the Hydraulic Filters**

Genie requires that this procedure be performed yearly or every 1000 hours, whichever comes first. Perform this procedure more often if dusty conditions exist.

Replacement of the hydraulic filters is essential for good machine performance and service life. A dirty or clogged filter may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require that the filters be replaced more often.

**CAUTION** Bodily injury hazard. Beware of hot oil. Contact with hot oil may cause severe burns.

Note: Perform this procedure with the engine off.

**Hydraulic return filter**

- 1 Open the ground controls side turntable cover and locate the hydraulic return filter housing on top of the hydraulic tank.
- 2 Remove the cap from the filter housing.
- 3 Lift the handle on the filter element and rotate the element counterclockwise to release the element from the housing.
- 4 Remove the filter element from the filter housing.

- 5 Install the new filter element into the filter housing.
- 6 Push the filter element down to be sure the O-ring on the element is fully seated into the housing.
- 7 Rotate the filter element clockwise to lock it in place.
- 8 Install the filter housing cap.
- 9 Use a permanent ink marker to write the date and number of hours from the hour meter on the oil filter housing.

**Medium and high pressure filters**

Note: The medium pressure filter is for the charge pump and the high pressure filter is for all machine functions except the drive circuit and oscillating axle circuit.

- 10 Open the engine side turntable cover and locate the medium and high pressure filters located near the pump.
- 11 Place a suitable container under each filter.
- 12 Remove the filter housings by using a wrench on the nut provided on the bottom of the housings.

## CHECKLIST D PROCEDURES

13 Remove the filter elements from the housings.

14 Inspect the housing seals and replace them if necessary.

15 Install the new filter elements into the housings and tighten them securely.

Note: The medium and high pressure filters use the same elements.

16 Clean up any oil that may have spilled during the installation procedure.

17 Use a permanent ink marker to write the date and number of hours from the hour meter on the oil filter housings.

18 Start the engine from the ground controls.

19 Inspect the filter housings and related components to be sure that there are no leaks.

## D-7

### Perform Engine Maintenance - Perkins Models



Engine specifications require that this procedure be performed every 1,000 hours.

#### All models:

- Alternator and fan belts- replace
- Engine valve lash- check/adjust

#### 404F-22 models:

- Air pump belt- replace
- Crankcase breather canister- replace

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

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#### Perkins 400 Series Operation Manual

Genie part number 94890

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#### Perkins 404F Series Operation Manual

Genie part number 1251562

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## CHECKLIST D PROCEDURES

**D-8****Perform Engine Maintenance -  
Deutz Models**

Engine specifications require that this procedure be performed every 1,000 hours.

**All models:**

- Engine mounts- check
- Hoses and clamps- check
- V-belts- adjust/replace
- Cold starting device (if equipped)- check
- Fuel filter- replace

**D2011L03i models:**

- Glow plugs- check
- Valve clearance- check/adjust

**D 2.9 L4 models:**

- V-belts- replace
- V-rib belts and tensioning pulley- adjust

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547) OR the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 3012-3893)

**Deutz 2011 Series Operation Manual**

Genie part number 139320

**Deutz 2.9 L4 Series Operation Manual**

Genie part number 1251561

**D-9****Perform Engine Maintenance -  
Deutz Models**

Engine specifications require that this procedure be performed annually.

**D 2.9 L4 Models:**

- Fuel pre-filter- replace

Required maintenance procedures and additional engine information are available in the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 3012-3893)

**Deutz 2.9 L4 Series Operation Manual**

Genie part number 1251561

# Checklist E Procedures

## E-1

### Test or Replace the Hydraulic Oil



Genie requires that this procedure be performed every 2000 hours or every two years, whichever comes first. Perform this procedure more often if dusty conditions exist.

Replacement or testing of the hydraulic oil is essential for good machine performance and service life. Dirty oil and suction strainers may cause the machine to perform poorly and continued use may cause component damage. Extremely dirty conditions may require oil changes to be performed more often.

Note: Before replacing the hydraulic oil, the oil may be tested by an oil distributor for specific levels of contamination to verify that changing the oil is necessary. **If the hydraulic oil is not replaced at the two year inspection, test the oil quarterly. Replace the oil when it fails the test.**

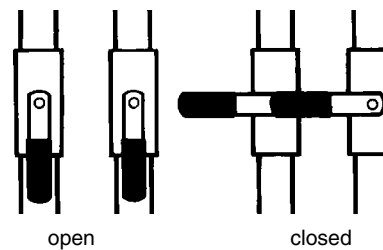
Note: When removing a hose assembly or fitting, the O-ring (if equipped) on the fitting and/or the hose end must be replaced. All connections must be torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the boom in the stowed position.

- 1 **Ford models:** Turn the valve on the LPG tank clockwise to the off position (if equipped). Then slowly disconnect the hose from the LPG tank.
- 2 **Ford models:** Open the clamps from the LPG tank straps and remove the LPG tank from the machine (if equipped).
- 3 Locate the two hydraulic tank valves at the hydraulic tank through the access hole underneath the turntable. Close the valves.

### NOTICE

Component damage hazard. The engine must not be started with the hydraulic tank shut-off valves in the closed position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.



## CHECKLIST E PROCEDURES

4 Remove the drain plug from the hydraulic tank and completely drain the tank into a container of suitable capacity. Refer to Section 2, *Specifications*.

5 Tag, disconnect and plug the two suction hoses and supply hose for the auxiliary pump from the hydraulic tank. Cap the fittings on the tank.

Note: The hoses can be accessed through the access hole under the turntable.

6 Disconnect and plug the return filter hydraulic hose at the return filter. Cap the fitting on the filter housing.

7 Remove the ground controls side turntable cover.

8 Support the hydraulic tank with an appropriate lifting device.

9 Remove the hydraulic tank mounting fasteners.

10 Remove the hydraulic tank from the machine.

**⚠WARNING** Crushing hazard. The hydraulic tank could become unbalanced and fall if not properly supported when removed from the machine.

11 Remove the hydraulic return filter housing mounting fasteners. Remove the hydraulic return filter housing from the hydraulic tank.

12 Remove the suction strainers from the tank and clean them using a mild solvent.

13 Rinse out the inside of the tank using a mild solvent.

14 Install the suction strainers using a thread sealant on the threads.

15 Install the drain plug using a thread sealant on the threads.

16 Install the hydraulic return filter housing onto the hydraulic tank.

17 Install the hydraulic tank onto the machine.

18 Install the two suction hoses to the suction strainers.

19 Install the supply hose for the auxiliary power unit and the return filter hose.

20 Open the two hydraulic tank valves at the hydraulic tank.

21 Fill the tank with the proper hydraulic oil for your machine until the level is within the top 2 inches / 5 cm of the sight gauge. Do not overfill. Refer to Section 2, *Specifications*.

22 Clean up any oil that may have spilled.

23 Prime the pump. Refer to Repair Procedure 7-2, *How to Prime the Pump*.

Note: Always use pipe thread sealant when installing the suction hose fittings and the drain plug.

## CHECKLIST E PROCEDURES

**E-2****Grease the Steer Axle Wheel Bearings, 2WD Models**

Genie requires that this procedure be performed every 2000 hours or every two years, whichever comes first. Perform this procedure more often if dusty conditions exist.

Maintaining the steer axle wheel bearings is essential for safe machine operation and service life. Operating the machine with loose or worn wheel bearings may cause an unsafe operating condition and continued use may result in component damage. Extremely wet or dirty conditions or regular steam cleaning and pressure washing of the machine may require that this procedure be performed more often.

- 1 Loosen the wheel lug nuts. Do not remove them.
- 2 Block the non-steer wheels, then center a lifting jack under the steer axle.
- 3 Raise the machine 6 inches / 15 cm and place blocks under the drive chassis for support.
- 4 Remove the lug nuts. Remove the tire and wheel assembly.
- 5 Check for wheel bearing wear by attempting to move the wheel hub side to side, then up and down.
- ⦿ Result: There should be no side to side or up and down movement.

**Skip to step 10 if there is no movement.**

- 6 Remove the dust cap from the hub. Remove the cotter pin from the castle nut.
- 7 Tighten the castle nut to 35 ft-lbs / 47 Nm to seat the bearings.
- 8 Loosen the castle nut and re-tighten to 8 ft-lbs / 11 Nm.
- 9 Check for wheel bearing wear by attempting to move the wheel hub side to side, then up and down.
- ⦿ Result: If there is no side to side or up and down movement, continue with step 11 and grease the wheel bearings.
- ✗ Result: If there is side to side or up and down movement, continue to step 11 and replace the wheel bearings with new ones.

Note: When replacing a wheel bearing, both the inner and outer bearings, including the pressed-in races, must be replaced.

- 10 Remove the dust cap from the hub. Remove the cotter pin from the castle nut.
- 11 Remove the castle nut.
- 12 Pull the hub off of the spindle. The washer and outer bearing should fall loose from the hub.
- 13 Place the hub on a flat surface and gently pry the bearing seal out of the hub. Remove the rear bearing.
- 14 Pack both bearings with clean, fresh grease.
- 15 Place the large inner bearing into the rear of the hub.

CHECKLIST E PROCEDURES

- 16 Install a new bearing grease seal into the hub by pressing it evenly into the hub until it is flush.
- 17 Slide the hub onto the yoke spindle.

**NOTICE** Component damage hazard. Do not apply excessive force or damage to the lip of the seal may occur.

- 18 Place the outer bearing into the hub.
  - 19 Install the washer and castle nut.
  - 20 Tighten the slotted nut to 35 ft-lbs / 47 Nm to seat the bearings.
  - 21 Loosen the castle nut and re-tighten to 8 ft-lbs / 11 Nm.
  - 22 Install a new cotter pin. Bend the cotter pin to lock it in.
- Note: Always use a new cotter pin when installing a castle nut.
- 23 Install the dust cap, then the tire and wheel assembly. Torque the wheel lug nuts to specification. Refer to Section 2, *Specifications*.

**E-3**  
**Perform Engine Maintenance - Perkins Models**



Engine specifications require that this procedure be performed every 2,000 hours.

- All models:**
- Alternator- inspect
  - Engine mounts- inspect
  - Starter motor- inspect

- 404D-22 models:**
- Engine crankcase breather element- replace

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

<b>Perkins 400 Series Operation Manual</b>	
Genie part number	94890
<b>Perkins 404F Series Operation Manual</b>	
Genie part number	1251562



## CHECKLIST E PROCEDURES

## E-4 Perform Engine Maintenance - Deutz Models



Engine specifications require that this procedure be performed every 2 years.

### D2011L03i models:

- V-Belts- replace
- Glow plugs- replace

### D 2.9 L4 Models:

- Coolant- replace

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547) OR the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 3012-3893)

<b>Deutz 2011 Series Operation Manual</b>	
Genie part number	139320

<b>Deutz 2.9 L4 Series Operation Manual</b>	
Genie part number	1251561

## E-5 Perform Engine Maintenance - Deutz Models



Engine specifications require that this procedure be performed every 3,000 hours..

### D2011L03i models:

- Toothed belt- replace
- Injection valve- replace

### D 2.9 L4 Models:

- V-rib belt and tensioning pulley- replace

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547) OR the *Deutz 2.9 L4 Series Operation Manual* (Deutz part number 3012-3893)

<b>Deutz 2011 Series Operation Manual</b>	
Genie part number	139320

<b>Deutz 2.9 L4 Series Operation Manual</b>	
Genie part number	1251561

## CHECKLIST E PROCEDURES

**E-6****Perform Engine Maintenance -  
Perkins Models**

Engine specifications require that this procedure be performed every 3,000 hours.

**All models:**

- Fuel injectors- test/replace
- Water pump- inspect

**404F-22 models:**

- Coolant temperature regulator- replace
- Diesel particulate filter- clean
- Glow plugs (ARD combustion)- replace
- Radiator pressure cap- clean/replace

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S) OR the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

**Perkins 400 Series Operation Manual**

Genie part number 94890

**Perkins 404F Series Operation Manual**

Genie part number 1251562

**E-7****Perform Engine Maintenance -  
Perkins 404D-22 Models**

Engine specifications require that this procedure be performed every 3,000 hours or 2 years, whichever comes first.

- Engine coolant - replace

Required maintenance procedures and additional engine information are available in the *Perkins 400 Series Operation Manual* (Perkins part number TPD 1443S).

**Perkins 400 Series Operation Manual**

Genie part number 94890

## E-8 Perform Engine Maintenance - Deutz Models



Engine specifications require that this procedure be performed every 6000 hours.

### D2011L03i models:

- Toothed belt- replace

Required maintenance procedures and additional engine information are available in the *Deutz 2011 Series Operation Manual* (Deutz part number 0312-3547).

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#### Deutz 2011 Series Operation Manual

Genie part number 139320

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## E-9 Perform Engine Maintenance - Perkins 404F-22 Models



Engine specifications require that this procedure be performed every 12,000 hours or 6 years.

- Coolant (ELC)- replace

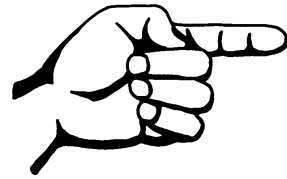
Required maintenance procedures and additional engine information are available in the *Perkins 404F Series Operation Manual* (Perkins part number SEBU8609).

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#### Perkins 404F Series Operation Manual

Genie part number 1251562

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# Repair Procedures



## Observe and Obey:

- ☑ Repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.

## Before Repairs Start:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate Operator's Manual on your machine.
- ☑ Be sure that all necessary tools and parts are available and ready for use.
- ☑ Use only Genie approved replacement parts.
- ☑ Read each procedure completely and adhere to the instructions. Attempting shortcuts may produce hazardous conditions.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power disconnected from the machine

## About This Section

Most of the procedures in this section should only be performed by a trained service professional in a suitably equipped workshop. Select the appropriate repair procedure after troubleshooting the problem.

Perform disassembly procedures to the point where repairs can be completed. To re-assemble, perform the disassembly steps in reverse order.

## Symbols Legend



Safety alert symbol—used to alert personnel to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

### **⚠ DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### **⚠ WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **⚠ CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may cause minor or moderate injury.

### **NOTICE**

Indicates a potentially hazardous situation which, if not avoided, may result in property damage.

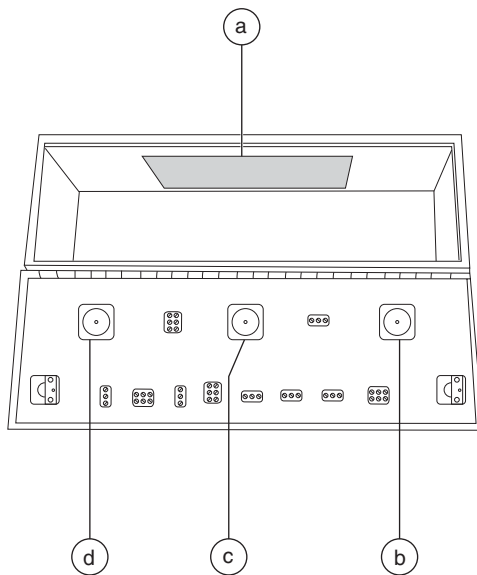
⦿ Indicates that a specific result is expected after performing a series of steps.

✗ Indicates that an incorrect result has occurred after performing a series of steps.

# Platform Controls

The platform control box contains one printed circuit board. The ALC-500 circuit board inside the platform control box controls all proportional machine functions from the platform. The joystick controllers at the platform controls utilize Hall Effect technology and require no adjustment. The operating parameters of the joysticks are stored in memory at the ECM circuit board at the platform controls. If a joystick error occurs or if a joystick is replaced, it will need to be calibrated before that particular machine function will operate. See 1-2, *How to Calibrate a Joystick*.

Each joystick controller should operate smoothly and provide proportional speed control over its entire range of motion.



- a ALC-500 circuit board
- b drive/steer joystick controller
- c secondary boom up/down joystick controller
- d primary boom up/down and turntable rotate left/right joystick controller

## 1-1

### ALC-500 Circuit Board

**⚠ WARNING** Electrocution hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Note: When the ALC-500 circuit board is replaced, the joystick controllers will need to be calibrated. See 1-2, *How to Calibrate a Joystick*.

### How to Remove the ALC-500 Circuit Board

- 1 Push in the red Emergency Stop button to the off position at both the ground and platform controls.
- 2 Remove the platform control box lid retaining fasteners. Open the control box lid.
- 3 Locate the ALC-500 circuit board mounted to the inside of the platform control box.

## PLATFORM CONTROLS

- 4 Attach a grounded wrist strap to the ground screw inside the platform control box.

**NOTICE**

Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. Maintain firm contact with a metal part of the machine that is grounded at all times when handling printed circuit boards OR use a grounded wrist strap.

- 5 Carefully disconnect the wire connectors from the circuit board.
- 6 Remove the ALC-500 circuit board mounting fasteners.
- 7 Carefully remove the ALC-500 circuit board from the platform control box.

## 1-2 Joysticks

### How to Calibrate a Joystick

The joysticks on this machine utilize digital Hall Effect technology for proportional control. If a joystick is disconnected or replaced, it must be calibrated before that particular machine function will operate.

Note: The joystick must be calibrated before the threshold, max-out or ramping can be set.

Note: Perform this procedure with the engine off.

- 1 Open the platform control box.

- 2 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.
  - 3 Turn the key switch to platform control. Do not start the engine.
  - 4 Select a joystick to calibrate.
  - 5 Disconnect the wire harness connector from the joystick for approximately 10 seconds or until the alarm sounds. Connect the wire harness connector to the joystick.
  - 6 Move the joystick full stroke in either direction and hold for 5 seconds.
  - 7 Return the joystick to the neutral position, pause for a moment, then move the joystick full stroke in the opposite direction. Hold for 5 seconds.
- ⓘ Result: The alarm should sound indicating successful joystick calibration.
- ✖ Result: The alarm does not sound. Check the electrical connections or replace the joystick.
- 8 Repeat this procedure for each joystick controlled machine function including the thumb rocker steer switch.

Note: No machine function should operate while performing the joystick calibration procedure.

## PLATFORM CONTROLS

## How to Adjust the Joystick Max-out Setting

The max-out setting of a joystick controls the maximum speed of a joystick-controlled machine function. Whenever a hydraulic cylinder, drive motor or hydraulic pump is replaced, the max-out setting should be adjusted to maintain optimum performance. The max-out settings on the joystick can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

**Note:** Perform this procedure with the boom in the stowed position.

- 1 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.
  - 2 Turn the key switch to platform control. Do not start the engine.
  - 3 Push in the platform controls red Emergency Stop button to the off position.
  - 4 Do not press down the foot switch.
  - 5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.
  - 6 When the alarm sounds, release the drive enable toggle switch.
  - 7 Momentarily activate the drive enable toggle switch in the right direction 4 times.
  - **Result:** There should be a pause and the alarm should sound 4 times indicating that the machine is in max-out calibration mode.
  - ✗ **Result:** The alarm does not sound. Repeat steps 3 through 7.
  - 8 Start the engine from the platform controls and press down the foot switch.
  - 9 Start a timer and activate the machine function that needs to be adjusted. Record the time it takes for that function to complete a full cycle (ie; boom up).
  - 10 Compare the machine function time with the function times listed in Section 2, *Specifications*. Determine whether the function time needs to increase or decrease.
  - 11 While the joystick is activated, adjust the max-out setting to achieve the proper function cycle time. Momentarily move the drive enable toggle switch in the right direction to increase the function speed or momentarily move the drive enable toggle switch in the left direction to decrease the function speed.
- Note:** Each time the drive enable toggle switch is momentarily moved, the function speed will change in 2% increments.
- 12 Repeat steps 9 through 11 for each joystick controlled machine function.



## PLATFORM CONTROLS

13 Return the joystick to the neutral position and wait for approximately 10 seconds to allow the settings to be saved.

⊙ Result: The alarm should sound indicating that the settings have been saved in memory.

✗ Result: The alarm does not sound. The minimum or maximum adjustment has been obtained. No changes can be saved.

Note: Do not operate any machine function during the 10 second waiting time.

14 Cycle the red Emergency Stop button off, then back on.

## How to Adjust the Joystick Ramp Rate Setting

The ramp rate setting of a joystick controls the time at which it takes for the joystick to reach maximum output, when moved out of the neutral position. The ramp rate settings of a joystick can be changed to compensate for hydraulic pump wear to maintain peak performance from the machine.

Note: Perform this procedure with the boom in the stowed position.

1 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.

2 Turn the key switch to platform control. Do not start the engine.

3 Push in the platform controls red Emergency Stop button to the off position.

4 Do not press down the foot switch.

5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.

6 When the alarm sounds, release the drive enable toggle switch.

7 Momentarily activate the drive enable toggle switch in the right direction 6 times.

⊙ Result: There should be a pause and the alarm should sound 6 times indicating that the machine is in ramp rate calibration mode.

✗ Result: The alarm does not sound. Repeat steps 3 through 7.

8 Start the engine from the platform controls and press down the foot switch.

9 Start a timer and simultaneously move the joystick in either direction full stroke. Note how long it takes the function to reach maximum speed. This is the ramp rate.

10 Compare the function ramp rate time with the table below and determine whether the ramp rate time needs to increase or decrease.

11 Release the foot switch.

## PLATFORM CONTROLS

- 12 While the joystick is activated, set the ramp rate. Momentarily move the drive enable toggle switch in the right direction to increase the time or momentarily move the drive enable toggle switch in the left direction to decrease the time.

Note: Each time the drive enable toggle switch is momentarily moved, the time will change in 5% increments.

- 13 Repeat steps 9 through 11 for each joystick controlled machine function.
- 14 Return the joystick to the neutral position and wait for approximately 10 seconds to allow the settings to be saved.
- ⦿ Result: The alarm should sound indicating that the settings have been saved in memory.

Note: Do not operate any machine function during the 10 second waiting time.

- 15 Cycle the red Emergency Stop button off, then back on.

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### Ramp rate (factory settings)

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#### Boom up/down

accelerate	3 second
decelerate	1 seconds

---

#### Turntable rotate

accelerate	2 seconds
decelerate	1 second

---

#### Drive

accelerate	2 seconds
decelerate to neutral	0.5 second
decelerate, change of direction	0.5 second
decelerate, coasting	0.75 second
decelerate, braking	1 second
decelerate, shift from low to high speed	1 second
decelerate, shift from high to low speed	3 seconds

---

## PLATFORM CONTROLS

## How to Adjust the Joystick Threshold Setting

The threshold setting of a joystick is the minimum output at which a function proportional valve can open and allow the function to operate.

Note: Perform this procedure with the boom in the stowed position.

- 1 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.
- 2 Turn the key switch to platform control. Do not start the engine.
- 3 Push in the red Emergency Stop button to the off position at the platform controls.
- 4 Do not press down the foot switch.
- 5 Move and hold the drive enable toggle switch in the right position and pull out the red Emergency Stop button to the on position.
- 6 When the alarm sounds, release the drive enable toggle switch.
- 7 Momentarily activate the drive enable toggle switch in the right direction 8 times.
- ⦿ Result: There should be a pause and the alarm should sound 8 times indicating that the machine is in threshold calibration mode.
- ✗ Result: The alarm does not sound. Repeat steps 3 through 7.
- 8 Start the engine from the platform controls and press down the foot switch.
- 9 Select a boom function joystick to set the threshold.
- 10 Slowly move the joystick off center in either direction just until the function begins to move.
- 11 Slowly move the joystick back to the neutral position. Just before the function stops moving, move the drive enable toggle switch to either side to set the threshold.
- ⦿ Result: The alarm should sound indicating a successful calibration.
- 12 Repeat steps 9 through 11 for each boom joystick-controlled machine function (boom up/down, boom extend/retract and turntable rotate).
- 13 Return the joystick to the neutral position and wait for approximately 10 seconds.
- ⦿ Result: The alarm should sound indicating that the settings have been saved in memory.

Note: Do not operate any machine function during the 10 second waiting time.

- 14 Cycle the red Emergency Stop button off, then back on.

# Platform Components

## 2-1

### Platform Leveling Slave Cylinder

The slave cylinder and the rotator pivot are the two primary supports for the platform. The slave cylinder keeps the platform level through the entire range of boom motion. It operates in a closed-circuit hydraulic loop with the master cylinder. The slave cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

### How to Remove the Platform Leveling Slave Cylinder

Note: Before cylinder removal is considered, bleed the slave cylinder to be sure there is no air in the closed loop.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Extend the primary boom until the slave cylinder barrel-end pivot pin is accessible.
- 2 Raise the primary boom slightly and place blocks under the platform for support.

- 3 Lower the primary boom until the platform is resting on the blocks just enough to support the platform.

Note: Do not rest the entire weight of the boom on the blocks.

- 4 Protect the slave cylinder rod from damage.

#### S-40 Models:

- 5 Tag, disconnect and plug the hydraulic hoses from the slave cylinder at the union located near the platform rotate counterbalance valve manifold and connect them together using a connector. Cap the fittings on the cylinder.

#### **WARNING**

Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

#### S-45 Models:

- 6 Tag, disconnect and plug the slave cylinder hoses at the union.
- 7 Pull the slave cylinder hoses through the platform rotator.
- 8 Remove the pin retaining fastener from the slave cylinder rod-end pivot pin. Do not remove the pin.

## PLATFORM COMPONENTS

- 9 Remove the external retaining fastener from the barrel-end pivot pin.
- 10 Use a soft metal drift to drive the rod-end pivot pin out.
- 11 Use a soft metal drift and drive the barrel-end pin out.
- 12 Carefully pull the cylinder out of the boom.

**NOTICE** Component damage hazard. Hoses can be damaged if they are kinked or pinched.

## How to Bleed the Slave Cylinder

Note: Do not start the engine. Use auxiliary power for this procedure.

- 1 Raise the primary boom to a horizontal position.
- 2 Move the platform level toggle switch up and down through two platform leveling cycles to remove any air that might be in the system.

## 2-2

### Platform Rotator

The platform rotator is a hydraulically activated helical gear assembly used to rotate the platform 160 degrees.

### How to Remove the Platform Rotator

**NOTICE** Component damage hazard. Mark the platform mounting weldment and the rotator flange before removing the platform mounting weldment. The platform mounting weldment must be replaced in the exact same position on the rotator flange as it was before removal. If a new rotator is installed or the rotator is disassembled, proper alignment can be achieved by rotating the rotator all the way to the left and then installing the platform mounting weldment all the way in the left position.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Remove the platform and platform support.

## PLATFORM COMPONENTS

**S-40 Models:**

- 2 Tag, disconnect and plug the hydraulic hoses from the platform rotator. Cap the fittings on the rotator.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

**S-45 Models:**

- 3 Tag and disconnect the hydraulic hoses from the "V1" and "V2" ports on the counterbalance valve manifold located on the platform rotator and connect them together using a connector. Cap the fittings on the manifold.
- 4 Support the platform leveling arms and platform mounting weldment with an appropriate lifting device, but do not apply any lifting pressure.

**All Models:**

- 5 Remove the six mounting bolts from the platform mounting weldment. Remove the center bolt and slide the platform mounting weldment off of the platform rotator.

**⚠ WARNING** Crushing hazard. The platform mounting weldment could become unbalanced and fall if it is not properly supported.

- 6 Support the platform rotator with an appropriate lifting device. Do not apply any lifting pressure.
- 7 Support the platform leveling slave cylinder. Protect the cylinder rod from damage.
- 8 Remove the pin retaining fasteners from both the slave cylinder rod-end pivot pin, and the rotator pivot pin.
- 9 Use a soft metal drift to drive both pins out, then remove the platform rotator from the machine.

**⚠ WARNING** Crushing hazard. The platform rotator could become unbalanced and fall if it is not properly supported.

## PLATFORM COMPONENTS

## 2-3 Platform Overload System

The platform overload system is designed to prevent the machine from continuing to operate when the load in the platform exceeds maximum rated capacity. Refer to the machine serial label for maximum capacity information.

If maximum platform capacity is exceeded, the alarm will sound at the platform controls and the platform overload indicator lights will flash at both the ground and platform controls. The ground and platform controls will become disabled and the engine will stop. Before normal machine operation can continue, the excess load will need to be removed from the platform.

If the excess load cannot be removed or if the operator at the platform controls is unable to correct the overloaded condition, another person at the ground controls can operate the machine using auxiliary power. There will be limited control of boom functions from the ground controls when using auxiliary power. Auxiliary power can be used to correct the overloaded platform condition in order to resume normal, safe operation of the machine.

**Note:** When the engine is shut off in an overloaded condition, it will not be possible to re-start the engine until the overloaded condition is corrected.

## How to Calibrate the Platform Overload System (if equipped)



Calibration of the platform overload system is essential to safe machine operation. Continued use of an improperly calibrated platform overload system could result in the system failing to sense an overloaded platform. The stability of the machine is compromised and it could tip over.

**Note:** Perform this procedure with the machine on a firm, level surface.

- 1 Turn the key switch to platform control. Start the engine and level the platform.
- 2 Determine the maximum platform capacity. Refer to the machine serial plate.
- 3 Remove all weight, tools and accessories from the platform.

**Note:** Failure to remove all weight, tools and accessories from the platform will result in an incorrect calibration.

- 4 Using a suitable lifting device, place a test weight equal to the maximum platform capacity at the center of the platform floor.

## PLATFORM COMPONENTS

- 5 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

⦿ Result: The overload indicator lights are off and the alarm does not sound. Proceed to step 6.

✗ Result: The overload indicator lights are flashing at the platform and ground controls, the alarm is sounding, and the engine stops. Slowly tighten the load spring adjustment nut in a clockwise direction in 10° increments until the overload indicator light turns off, and the alarm does not sound. Proceed to step 8.

Note: The platform will need to be moved up and down and allowed to settle between each adjustment.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

- 6 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

⦿ Result: The overload indicator lights are off at the platform and ground controls, and the alarm does not sound. Slowly loosen the load spring adjustment nut in a counterclockwise direction in 10° increments until the overload indicator light flashes at both the platform and ground controls, the alarm sounds, and the engine stops. Proceed to step 7.

✗ Result: The overload indicator lights are flashing at the platform and ground controls, the alarm is sounding, and the engine stops. Repeat this procedure beginning with step 5.

Note: The platform will need to be moved up and down and allowed to settle between each adjustment.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

- 7 Move the platform up and down by hand, so it bounces approximately 2.5 to 5 cm / 1 to 2 inches. Allow the platform to settle.

⦿ Result: The overload indicator lights are off and the alarm does not sound. Proceed to step 8.

✗ Result: The overload indicator lights are flashing at the platform and ground controls, the alarm is sounding, and the engine stops. Repeat this procedure beginning with step 5.

Note: There may be a 2 second delay before the platform overload indicator light and alarm responds.

- 8 Add an additional 10 lb / 4.5 kg test weight to the platform.

⦿ Result: The overload indicator light is flashing at both the ground and platform controls, the alarm is sounding, and the engine stops. Proceed to step 9.

✗ Result: The overload indicator light is off at both the ground and platform controls, and the alarm does not sound. Remove the additional 10 lb / 4.5 kg test weight. Repeat this procedure beginning with step 6.

Note: There may be a 2 second delay before the overload indicator lights and alarm turn off.

- 9 Test all machine functions from the platform controls.

⦿ Result: All platform control functions should not operate.



## PLATFORM COMPONENTS

- 10 Turn the key switch to ground control.
- 11 Test all machine functions from the ground controls.
  - ⦿ Result: All ground control functions utilizing engine power should not operate. (Only limited ground control functions utilizing APU power should function).
- 12 Using a suitable lifting device, lift the test weight off the platform floor.
  - ⦿ Result: The platform overload indicator light should be off at both the ground and platform controls and the alarm should not sound.

Note: There may be a 2 second delay before the overload indicator lights and alarm turn off.

- 13 Start the engine from the ground controls.
- 14 Test all machine functions from the ground controls.
  - ⦿ Result: All ground control functions should operate normally.
- 15 Turn the key switch to platform control.
- 16 Test all machine functions from the platform controls.
  - ⦿ Result: All platform control functions should operate normally.

# Jib Boom Components, S-45

## 3-1 Jib Boom

### How to Remove the Jib Boom

Note: Perform this procedure with the boom in the stowed position.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Remove the platform.
- 2 Remove the platform mounting weldment, and the platform rotator. See 2-2, *How to Remove the Platform Rotator*.
- 3 From the ground controls, raise the jib boom to a horizontal position.
- 4 Support the jib boom with a strap from an overhead crane.
- 5 Tag, disconnect and plug the hydraulic hoses from the jib boom lift cylinder. Cap the fittings on the cylinder.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 6 Remove the hose cover, hoses and cables from the side of the jib boom and set them aside.

**NOTICE** Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

- 7 Place blocks under the platform leveling cylinder for support. Protect the cylinder rod from damage.
- 8 Remove the pin retaining fasteners from the jib boom lift cylinder barrel-end pivot pin. Do not remove the pin.
- 9 Attach a lifting strap from an overhead crane to the lug on the rod end of the jib boom lift cylinder.
- 10 Use a soft metal drift to remove the jib boom lift cylinder rod-end pivot pin.
- 11 Use a soft metal drift to remove the jib boom lift cylinder barrel-end pivot pin, then remove the jib boom cylinder.

**⚠ WARNING** Crushing hazard. The jib boom lift cylinder could become unbalanced and fall when it is removed from the machine if it is not properly attached to the overhead crane.

- 12 Remove the pin retaining fasteners from the jib boom pivot pin. Use a soft metal drift to remove the pin, then remove the jib boom from the bellcrank.

**⚠ WARNING** Crushing hazard. The jib boom could become unbalanced and fall when it is removed from the machine if it is not properly attached to the overhead crane.

## JIB BOOM COMPONENTS, S-45

## 3-2 Jib Boom Lift Cylinder

### How to Remove the Jib Boom Lift Cylinder

Note: Perform this procedure with the boom in the stowed position.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Raise the jib boom slightly and place blocks under the platform mounting weldment. Then lower the jib boom until the platform is resting on the blocks just enough to support the platform.

Note: Do not rest the entire weight of the boom on the blocks.

- 2 Tag, disconnect and plug the jib boom lift cylinder hydraulic hoses. Cap the fittings on the cylinder.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 3 Remove the pin retaining fasteners from the jib boom lift cylinder rod-end pivot pin. Do not remove the pin.
- 4 Use a soft metal drift to tap the jib boom lift cylinder rod-end pivot pin half way out. Then lower one of the leveling arms to the ground. Tap the pin the other direction and lower the opposite leveling arm. Do not remove the pin.
- 5 Support the jib boom lift cylinder with a lifting device.
- 6 Remove the pin retaining fastener from the jib boom lift cylinder barrel-end pivot pin. Use a soft metal drift to remove the barrel-end pin and let the cylinder hang down.

**⚠ WARNING** Crushing hazard. The platform and jib boom could become unbalanced and fall when the jib boom barrel-end pivot pin is removed if not properly supported.

- 7 Attach a lifting strap from an overhead crane to the lug on the rod end of the jib boom lift cylinder.
- 8 Use a soft metal drift to remove the jib boom lift cylinder rod-end pin. Remove the cylinder from the machine.

**⚠ WARNING** Crushing hazard. The jib boom lift cylinder could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

# Boom Components

## 4-1 Cable Track

The primary boom cable track guides the cables and hoses running up the boom. It can be repaired link by link without removing the cables and hoses that run through it. Removing the entire primary boom cable track is only necessary when performing major repairs that involve removing the primary boom.

### How to Remove the Cable Track

**Note:** When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Raise the primary boom to a horizontal position.
  - 2 Locate the cables from the cable track to the platform control box. Number each cable and its entry location at the platform control box.
  - 3 Disconnect the cables from the platform control box.
  - 4 Remove the electrical outlet box bracket mounting fasteners. Remove the outlet box and lay it to the side.
  - 5 Remove the hose and cable clamp from the platform support.
  - 6 Tag, disconnect and plug the hydraulic hoses from the counterbalance valve manifold located on the platform rotator. Cap the fittings on the manifold.
- WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.
- 7 Tag, disconnect and plug the hydraulic hoses from the platform leveling cylinder at the union and connect the hoses from the cylinder together using a connector.
- WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.
- 8 Locate all electrical cables that enter the cable track.
  - 9 Tag and disconnect the electrical connectors for all cables that enter the cable track.
  - 10 Remove the retaining fasteners from the electrical connector receptacles for the cables that enter the cable track.
  - 11 Remove the fasteners from the drive speed limit switch mounted on the side of the cable track at the pivot end of the boom. Do not disconnect the wiring.

## BOOM COMPONENTS

12 Remove the fasteners from the side panel on the lower cable track, then remove the panel. Pull all of the cables out of the channel.

13 Remove the cable cover on the side of the boom.

14 Place blocks in between the upper and lower cable tracks and secure the upper and lower tracks together.

**WARNING** Crushing hazard. If the upper and lower cable tracks are not properly secured together, the cable track could become unbalanced and fall when it is removed from the machine.

15 Attach a lifting strap from an overhead crane to the cable track.

16 Remove the mounting fasteners from the upper cable track at the platform end of the extension boom.

17 Remove the cable track mounting fasteners that attach the lower cable track to the boom.

18 Remove the cable track from the machine and place it on a structure capable of supporting it.

**WARNING** Crushing hazard. The cable track could become unbalanced and fall if it is not properly attached to the overhead crane.

**NOTICE** Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

## How to Repair the Cable Track

**NOTICE** Component damage hazard. The boom cable track can be damaged if it is twisted.

Note: A cable track repair kit is available through the Genie Industries Service Parts Department, part no. 81007. The kit includes a 4 link section of cable track.

- 1 Visually inspect the cable track and determine which 4 link section needs to be replaced.
- 2 Remove the snap-on cable track spacers.
- 3 Carefully remove the external snap rings from the pivot pins at each end of the 4-link section to be removed.
- 4 Lift up the hoses and cables and carefully remove the damaged 4 link section of cable track.

**NOTICE** Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

- 5 Remove the snap-on spacers from the replacement section of the cable track.
- 6 Lift up the hoses and cables and carefully insert the new 4 link section of cable track.

**NOTICE** Component damage hazard. Hoses and cables can be damaged if they are kinked or pinched.

- 7 Connect the ends of the replacement cable track section to the existing cable track using the pivot pins and external snap rings.

Note: Be sure the pivot pins are installed from the inside out so the external snap rings are on the outside of the cable track.

- 8 Operate the boom extend/retract function through a full cycle to ensure smooth operation of the new section of cable track.

## BOOM COMPONENTS

## 4-2 Boom

### How to Remove the Boom

Consult the Genie Service Department for instructions on how to safely remove the boom assembly from the machine. Failure to read and follow the warnings listed below could result in death or serious injury.

**⚠WARNING** Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: Perform this procedure with the boom in the horizontal position after removing the platform and rotator.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Remove the platform. See 2-1, *How to Remove the Platform*.
  - 2 Remove the platform rotator and leveling slave cylinder. See 2-3, *How to Remove the Platform Rotator*.
  - 3 **S-45 Models:** Remove the jib boom. See 3-1, *How to Remove the Jib Boom*.
  - 4 Remove the mounting fasteners from the jib boom/platform rotate valve manifold on the end of the boom. Remove the manifold and set it aside.
  - 5 Remove the fasteners from the limit switch mounted on the side of the cable track. Do not disconnect the wiring.
  - 6 Support the cable track with an overhead crane.
  - 7 Remove the hose/cable clamp from the pivot end of the boom.
  - 8 Remove the hose/cable clamp at the platform end of the cable track.
  - 9 Remove the fasteners from the large cable track guide at the platform end of the cable track. Remove the guide.
  - 10 Remove the cotter pin from the clevis pin at the platform end of the cable track. Remove the clevis pin.
- Note: Always replace the cotter pin with a new one when removing a clevis pin.
- 11 Remove the fasteners from the side panel on the cable track to access the cable track mounting fasteners.

- 12 Remove the cable track mounting fasteners, then remove the cable track from the boom and lay it off to the side.

**NOTICE** Component damage hazard.  
The boom cable track can be damaged if it is twisted.

**NOTICE** Component damage hazard.  
Hoses can be damaged if they are kinked or pinched.

- 13 Remove the turntable end cover.

- 14 Remove the retaining fastener from the master cylinder rod-end pivot pin. Use a soft metal drift to remove the pin. Pull the cylinder back and secure it from moving.

**NOTICE** Component damage hazard.  
When pulling the master cylinder back, be sure not to damage the master cylinder hoses or fittings.

- 15 Remove the fasteners from the limit switch mounted to the turntable riser at the pivot end of the boom. Do not disconnect the wiring.

- 16 Tag, disconnect and plug the extension cylinder hydraulic hoses. Cap the fittings on the cylinder.

**WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 17 Attach an overhead 5 ton / 4500 kg crane to the center point of the boom.

- 18 Attach a similar lifting device to the boom lift cylinder.

- 19 Use the overhead crane to lift the boom to a horizontal position.

- 20 Place support blocks under the boom lift cylinder, across the turntable.

- 21 Remove the pin retaining fastener from the boom lift cylinder rod-end pin. Use a soft metal drift to remove the pin.

**WARNING** Crushing hazard. The boom lift cylinder will fall if not properly supported.

- 22 Lower the rod end of the lift cylinder onto support blocks. Protect the cylinder rod from damage.

- 23 Remove the pin retaining fastener from the boom pivot pin.

- 24 Use a soft metal drift to remove the boom pivot pin, then carefully remove the boom from the machine.

**WARNING** Crushing hazard. The primary boom could become unbalanced and fall when removed from the machine if not properly attached to the overhead crane.

## How to Disassemble the Boom

Note: Complete disassembly of the boom is only necessary if the secondary boom tube must be replaced. The extension cylinder can be removed without completely disassembling the boom. See 4-4, *How to Remove the Extension Cylinder*.

- 1 Remove the boom. See 4-2, *How to Remove the Boom*.
- 2 Place blocks under the extension cylinder for support.
- 3 Remove the external snap rings from the extension cylinder barrel-end pivot pin at the pivot end of the primary boom tube. Use a soft metal drift to remove the pin.
- 4 Remove and label the wear pads from the top side of the primary boom tube at the platform end of the boom.

Note: Pay careful attention to the location and amount of shims used with each wear pad.

- 5 Attach a lifting strap from an overhead crane to the secondary boom tube at the platform end of the boom for support.
- 6 Support and slide the secondary boom tube out of the primary boom tube. Place the secondary boom tube on blocks for support.

**⚠ WARNING** Crushing hazard. The secondary boom tube could become unbalanced and fall when removed from the primary boom tube if not properly supported.

Note: During removal, the overhead crane strap will need to be carefully adjusted for proper balancing.

- 7 Remove and label the wear pads from the top side of the secondary boom tube at the platform end of the boom.
- 8 Remove the trunnion pin retaining fasteners at the base end of the secondary boom tube. Use a slide hammer to remove the trunnion pins.
- 9 Carefully rotate the base end of the extension cylinder until the pin mounting bore is in a vertical position.
- 10 Remove the external snap rings from the extension cylinder rod-end pivot pin at the platform end of the secondary boom tube. Use a soft metal drift to remove the pin.
- 11 Support and slide the extension cylinder out of the base end of the secondary boom tube. Place the extension cylinder on blocks for support.

**⚠ WARNING** Crushing hazard. The extension cylinder may become unbalanced and fall when removed from the secondary boom tube if not properly supported.

Note: During removal, the overhead crane strap will need to be carefully adjusted for proper balancing.

- 12 Remove the label the wear pads from the extension cylinder.

Note: Pay careful attention to the location of each wear pad.



## BOOM COMPONENTS

### 4-3 Boom Lift Cylinder

The boom lift cylinder raises and lowers the boom. The boom lift cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

### How to Remove the Boom Lift Cylinder

**⚠ WARNING** Bodily injury hazard. This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Raise the boom to a horizontal position.
- 2 Place support blocks across the turntable under the boom lift cylinder.
- 3 Attach a 5 ton / 5000 kg overhead crane to the boom at the platform end for support. Do not lift the boom.
- 4 Support and secure both ends of the boom lift cylinder to a second overhead crane or similar lifting device.

- 5 Tag, disconnect and plug the boom lift cylinder hydraulic hoses. Cap the fittings on the cylinder.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 6 Remove the pin retaining fastener from the boom lift cylinder rod-end pivot pin. Use a soft metal drift to remove the pin. Lower the lift cylinder onto the blocks. Protect the cylinder rod from damage.

**⚠ WARNING** Crushing hazard. The lift cylinder could become unbalanced and fall if it is not properly supported.

- 7 Remove the four mounting fasteners from the lift cylinder barrel-end pivot pin mounting plate.
- 8 With the lift cylinder being supported by the overhead crane, pull the cylinder toward the platform to remove it from the machine.

**⚠ WARNING** Crushing hazard. The lift cylinder could become unbalanced and fall if it is not properly supported.

**NOTICE** Component damage hazard. The cables and hydraulic hoses can be damaged if the lift cylinder is pulled across them.

- 9 Using auxiliary power, activate the boom down function so the cylinder will retract. Retract the cylinder just enough until the rod end of the cylinder will clear the mounting bracket on the boom. Turn the machine off.

## BOOM COMPONENTS

## 4-4 Extension Cylinder

The extension cylinder extends and retracts the boom extension tube. The extension cylinder is equipped with counterbalance valves to prevent movement in the event of a hydraulic line failure.

### How to Remove the Extension Cylinder

**⚠ WARNING** This procedure requires specific repair skills, lifting equipment and a suitable workshop. Attempting this procedure without these skills and tools could cause death or serious injury and significant component damage. Dealer service is strongly recommended.

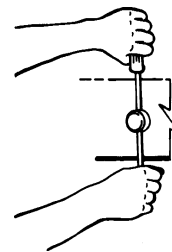
Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Extend the boom until the extension cylinder rod-end pivot pins are accessible in the extension tube.
- 2 Remove the master cylinder. See 4-5, *How to Remove the Master Cylinder*.
- 3 Raise the boom to a horizontal position.
- 4 Remove the external snap rings from the extension cylinder rod-end pins (at the platform end). Use a soft metal drift to remove the pins.
- 5 Remove the turntable end cover.

- 6 Tag, disconnect and plug the extension cylinder hydraulic hoses. Cap the fittings on the cylinder.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 7 Remove the barrel-end pivot pin retaining fasteners.
- 8 Place a rod through the barrel-end pivot pin and twist to remove the pin.



- 9 Support and slide the extension cylinder out of the pivot end of the boom.

**⚠ WARNING** Crushing hazard. The extension cylinder will fall when it is removed from the extension boom if it is not properly supported.

Note: Note the length of the cylinder after removal. The cylinder must be at the same length for installation.

## BOOM COMPONENTS

## 4-5 Platform Leveling Master Cylinder

The master cylinder acts as a pump for the slave cylinder. It is part of the closed circuit hydraulic loop that keeps the platform level through the entire range of boom motion. The master cylinder is located at the base of the boom.

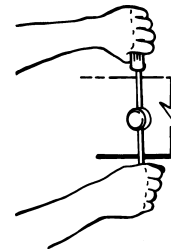
### How to Remove the Platform Leveling Master Cylinder

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation. Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Remove the turntable end cover to access the master cylinder.
- 2 Raise the boom until the master cylinder rod-end pivot pin is accessible.
- 3 Tag, disconnect and plug the master cylinder hydraulic hoses. Cap the fittings on the cylinder.

**WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 4 Attach a lifting strap from an overhead crane to the lug on the rod end of the master cylinder.
- 5 Remove the pin retaining fasteners from the master cylinder barrel-end pivot pin.
- 6 Place a rod through the barrel-end pivot pin and twist to remove the pin.



- 7 Remove the pin retaining fastener from the rod-end pivot pin.
- 8 Use a soft metal drift to remove the pin.
- 9 Remove the master cylinder from the machine.

**WARNING** Crushing hazard. The master cylinder could become unbalanced and fall if it is not properly attached to the overhead crane.

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# Engines

## 5-1

### RPM Adjustment - Deutz D2011L03I Models

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Refer to Maintenance Procedure C-7, *Check and Adjust the Engine RPM*.

## 5-2

### RPM Adjustment - Perkins 404D-22 Models

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Refer to Maintenance Procedure C-7, *Check and Adjust the Engine RPM*.

## 5-3

### Flex Plate

---

The flex plate acts as a coupler between the engine and the pump. It is bolted to the engine flywheel and has a splined center to drive the pump.

### How to Remove the Flex Plate

- 1 Disconnect the battery cables from the battery.

**⚠ WARNING** Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

- 2 Disconnect the electrical connectors at the electrical proportional controller, located on the drive pump.

#### Perkins models:

- 3 Remove the engine starter mounting fasteners. Remove the starter from the engine. Do not disconnect the wiring.
- 4 Support the drive pump with an appropriate lifting device. Then remove all of the bell housing to engine mounting bolts. Leave the pump connected to the bell housing.

## ENGINES

- 5 Carefully pull the pump and bell housing away from the engine and secure it from moving.

**NOTICE** Component damage hazard. Hoses can be damaged if they are kinked or pinched.

- 6 Remove the flex plate mounting fasteners, then remove the flex plate from the engine flywheel.

**Ford models:**

- 3 Support the drive pump assembly with an overhead crane or other suitable lifting device. Do not apply any lifting pressure.
- 4 Remove the drive pump retaining fasteners.
- 5 Carefully pull the drive pump out until the pump coupler separates from the flex plate.

**NOTICE** Component damage hazard. Hoses can be damaged if they are kinked or pinched.

- 6 Disconnect the electrical connector from the oxygen sensor at the tailpipe. Do not remove the oxygen sensor.
- 7 Support the muffler and bracket assembly with a suitable lifting device.
- 8 Remove the exhaust pipe fasteners at the muffler.

- 9 Remove the muffler bracket mounting fasteners from the bell housing. Carefully remove the muffler and bracket assembly from the engine.

- 10 Support the engine with an overhead crane or other suitable lifting device. Do not lift it.

- 11 Remove the engine mounting plate to bell housing fasteners.

- 12 Raise the engine slightly using the overhead crane and place a block of wood under the oil pan for support.

- 13 Remove all of the engine bell housing retaining fasteners.

- 14 Carefully remove the bell housing from the engine.

- 15 Remove the flex plate mounting fasteners. Remove the flex plate from the flywheel.

## ENGINES

## How to Install the Flex Plate

- 1 Install the flex plate onto the engine flywheel with the rubber vibration isolators towards the pump.
- 2 Apply Loctite® removable thread sealant to the flex plate fasteners and loosely install the fasteners.
- 3 **Deutz models:** Torque the flex plate mounting bolts in sequence to 28 ft-lbs / 38 Nm. Then torque the flex plate mounting bolts in sequence to 40 ft-lbs / 54 Nm.  
**Ford and Perkins models:** Torque the flex plate mounting bolts in sequence to 14 ft-lbs / 19 Nm. Then torque the flex plate mounting bolts in sequence to 20 ft-lbs / 27 Nm.
- 4 Apply a high viscosity coupling grease (Genie part number 128025) to the splines of the pump shaft and flex plate.

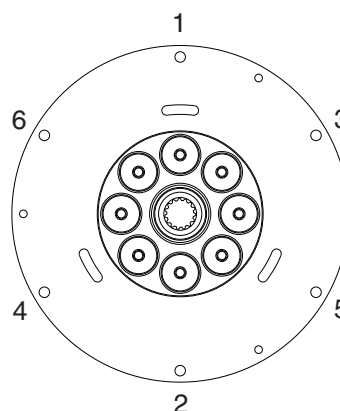
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### Grease Specification

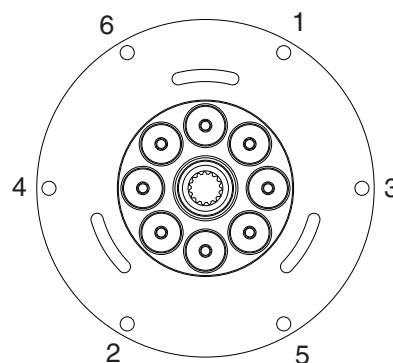
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Shell Alvania® Grease CG, NLGI 0/1 or equivalent.

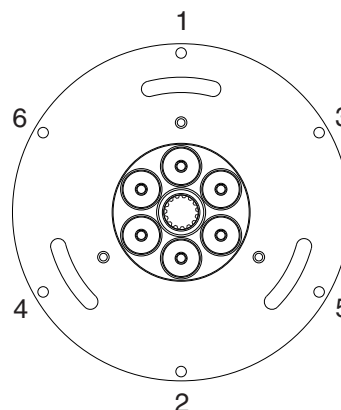
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Ford models



Deutz models



Perkins models

## ENGINES

## How to install the Pump and Bell Housing Assembly

- 1 Install the pump and bell housing assembly.

**Deutz models:** Torque the bell housing mounting bolts labeled "C" in sequence to 28 ft-lbs / 38 Nm. Then torque the bell housing mounting bolts labeled "C" in sequence to 40 ft-lbs / 54 Nm.

**Ford models:** Torque the bell housing mounting bolts labeled "A" and "B" in sequence to 28 ft-lbs / 38 Nm and the mounting bolts labeled "C" to 49 ft-lbs / 66 Nm. Then torque the bell housing mounting bolts labeled "A" and "B" in sequence to 40 ft-lbs / 54 Nm and the mounting bolts labeled "C" to 70 ft-lbs / 95 Nm.

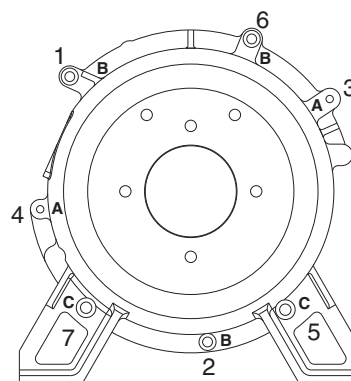
**Perkins models:** Torque the bell housing mounting bolts labeled "B" in sequence to 28 ft-lbs / 38 Nm and the mounting bolts labeled "A" to 49 ft-lbs / 66 Nm. Then torque the bell housing mounting bolts labeled "B" in sequence to 40 ft-lbs / 54 Nm and the mounting bolts labeled "A" to 70 ft-lbs / 95 Nm.

### NOTICE

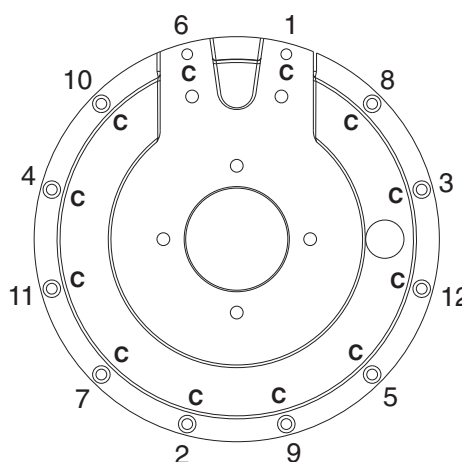
Component damage hazard. When installing the pump, do not force the pump coupler into the flexplate or damage to the pump shaft seal may occur.

### NOTICE

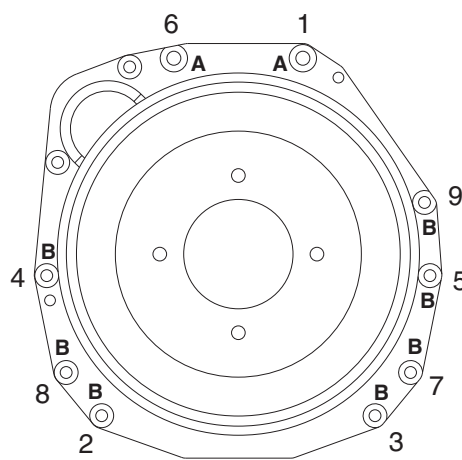
Component damage hazard. Do not force the drive pump during installation or the flex plate teeth may become damaged.



Ford models



Deutz models



Perkins models

## ENGINES

**5-4****Ford MSG-425 Engine  
Fault Codes****How to Retrieve Engine Fault  
Codes**

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor and will turn on the Check Engine Light.

Refer to Section 5, *How to Retrieve Ford MSG-425 Engine Fault Codes* for your specific model of engine. Use the Fault Code Chart within Section 5 to aid in identifying the fault.

**5-5****Engine Fault Codes -  
Deutz D 2.9 L4 and  
Perkins 404F-22 Models****How to Retrieve Engine Fault  
Codes**

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor. One or more fault LED's will illuminate on the display located at the ground control box. The active fault code will also be displayed on the LCD screen.

If a fault occurs that does not result in an engine shutdown, the engine rpm will go into limp home mode resulting in the loss of high rpm.

Refer to Section 5, *How to Retrieve Engine Fault Codes* for your specific model of engine. Use the Fault Code Chart within Section 5 to aid in identifying the fault.



# Hydraulic Pumps

## 6-1 Function Pump

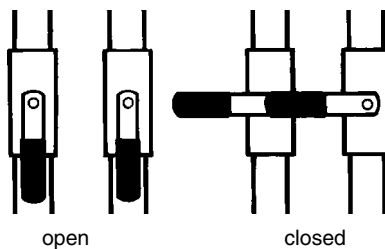
### How to Remove the Function Pump

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

#### 1 Models with hydraulic tank shut-off valves:

Locate the two hydraulic tank valves at the hydraulic tank through the access hole underneath the turntable. Close the valves.



#### NOTICE

Component damage hazard. The engine must not be started with the hydraulic tank shut-off valves in the closed position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.

#### Models without hydraulic tank shut-off

**valves:** Remove the drain plug from the hydraulic tank and completely drain the tank into a suitable container. See capacity specifications.

- 2 Tag, disconnect and plug the function pump hydraulic hoses. Cap the fittings on the pump.

#### WARNING

Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 3 Remove the pump mounting bolts. Carefully remove the pump.

#### Models with hydraulic tank shut-off valves:

#### NOTICE

Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

#### Models without hydraulic tank shut-off valves:

#### NOTICE

Component damage hazard. Be sure to fill the hydraulic tank to specification and prime the pump after installing the pump.

## HYDRAULIC PUMPS

## 6-2 Drive Pump

The drive pump is a bi-directional variable displacement piston pump. The pump output is controlled by the electro-proportional controller, located on the pump. The only adjustment that can be made to the pump is the neutral or null adjustment. Any internal service to the pump should only be performed at an authorized Eaton Hydraulics center. Call Genie Industries Service Department to locate your local authorized service center.

### How to Remove the Drive Pump

**NOTICE** Component damage hazard. The work area and surfaces where this procedure will be performed must be clean and free of debris that could get into the hydraulic system and cause severe component damage. Dealer service is recommended.

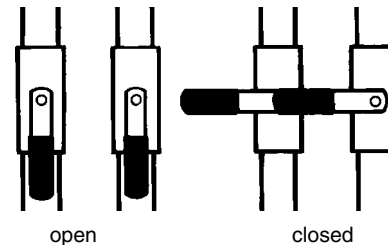
Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Disconnect the electrical connection at the electro-proportional controller located on the drive pump.

#### 2 Models with hydraulic tank shut-off valves:

Locate the two hydraulic tank valves at the hydraulic tank through the access hole underneath the turntable. Close the valves.



#### NOTICE

Component damage hazard. The engine must not be started with the hydraulic tank shut-off valves in the closed position or component damage will occur. If the tank valves are closed, remove the key from the key switch and tag the machine to inform personnel of the condition.

#### Models without hydraulic tank shut-off

**valves:** Remove the drain plug from the hydraulic tank and completely drain the tank into a suitable container. See capacity specifications.

- 3 Tag and disconnect and plug the hydraulic hoses from the drive and function pumps. Cap the fittings on the pumps.

#### WARNING

Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

## HYDRAULIC PUMPS

- 4 Support the pump with a lifting device and remove the two drive pump mounting fasteners.
- 5 Carefully pull the drive pump out until the pump coupler separates from the flex plate.
- 6 Remove the drive pump from the machine.

**NOTICE** Component damage hazard. The hydraulic pump may become unbalanced and fall if not properly supported.

**Models with hydraulic tank shut-off valves:**

**NOTICE** Component damage hazard. Be sure to open the two hydraulic tank valves and prime the pump after installing the pump.

**Models without hydraulic tank shut-off valves:**

**NOTICE** Component damage hazard. Be sure to fill the hydraulic tank to specification and prime the pump after installing the pump.

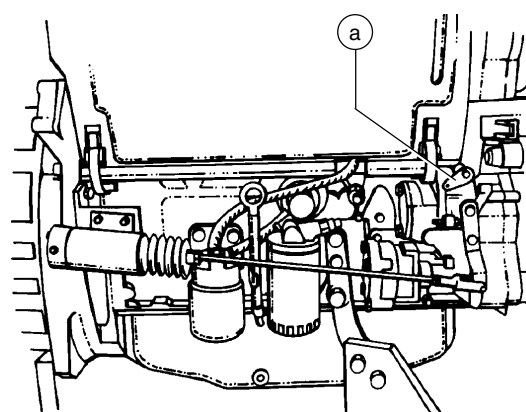
**How to Prime the Pump**

- 1 Connect a 0 to 600 psi / 0 to 50 bar pressure gauge to the test port on the drive pump.
  - 2 Remove the safety pin (if equipped) from the engine pivot plate latch.
- Note: The engine pivot plate latch is located under the engine turntable pivot plate at the counterweight end of the machine.
- 3 Open the engine pivot plate latch and swing the engine pivot plate out and away from the machine.

- 4 **Ford models:** Close the valve on the LPG tank then disconnect the hose from the tank. Move the fuel select switch to the LPG position.

**Perkins models:** Disconnect the engine wiring harness from the fuel solenoid at the injector pump.

**Deutz models:** Hold the manual fuel shutoff valve clockwise to the closed position.



a manual fuel shutoff valve

- 5 Have another person crank the engine with the starter motor for 15 seconds, wait 15 seconds, then crank the engine an additional 15 seconds or until the pressure reaches 320 psi / 22 bar.
- 6 **Ford models:** Connect the LPG hose to the LPG tank and open the valve on the tank. Move the fuel select switch to the gasoline position.
- Perkins models:** Connect the engine wiring harness to the fuel solenoid.
- Deutz models:** Release the manual fuel shutoff valve.
- 7 Start the engine from the ground controls and check for hydraulic leaks.

# Manifolds

## 7-1

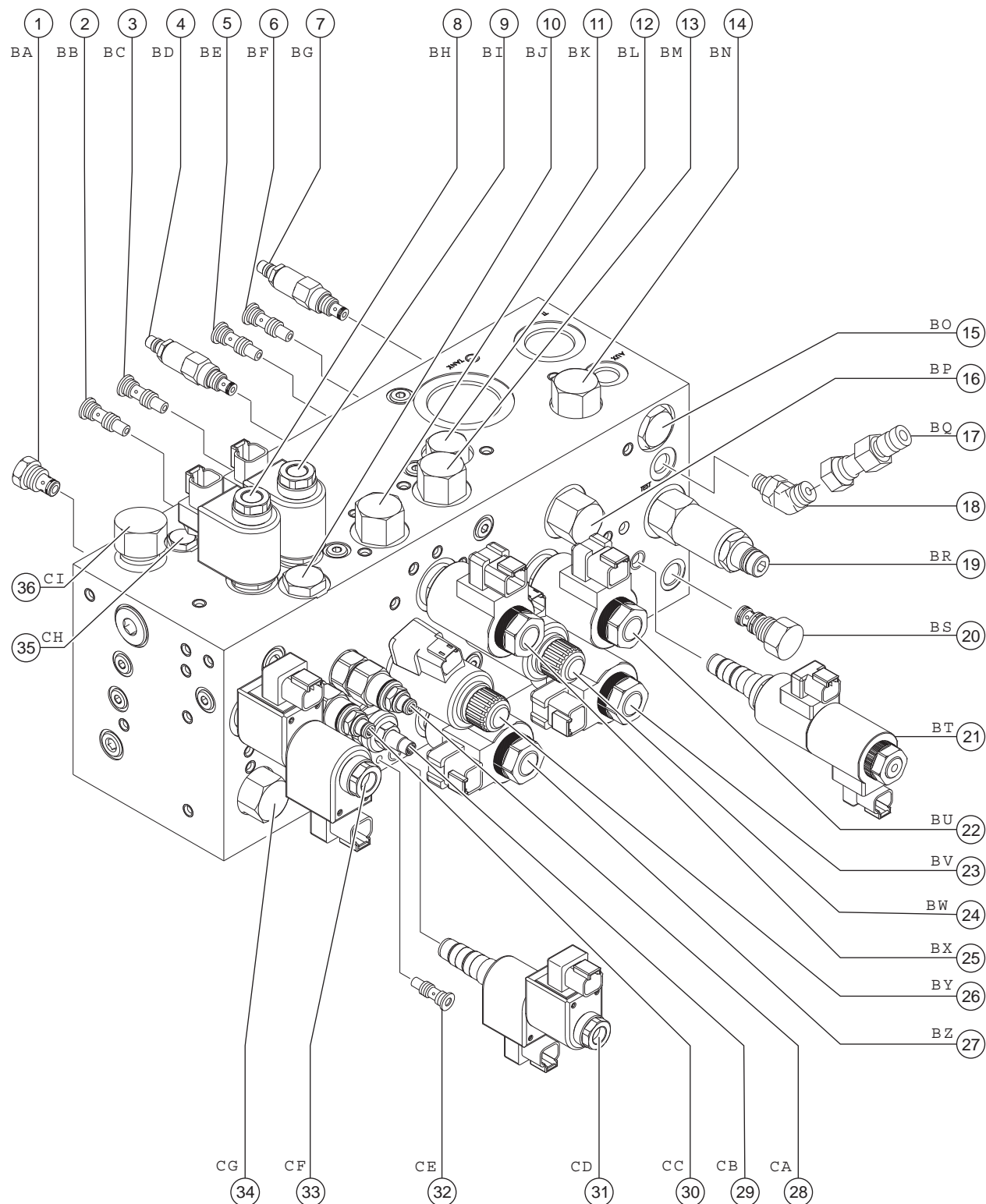
### Function Manifold Components

The function manifold is located underneath the ground controls side turntable cover.

Index No.	Description	Schematic Item	Function	Torque
1	Check valve .....	BA .....	Platform rotate circuit prevents fluid from draining back to tank .....	20-25 ft-lbs / 27-34 Nm
2	Check valve .....	BB .....	Differential sensing circuit, platform rotate right and jib boom down (S-45) .....	8-10 ft-lbs / 10-15 Nm
3	Check valve .....	BC .....	Differential sensing circuit, platform level up .....	8-10 ft-lbs / 10-15 Nm
4	Relief valve, 2200 psi / 152 bar .....	BD .....	Boom down relief .....	20-25 ft-lbs / 27-34 Nm
5	Check valve .....	BE .....	Differential sensing circuit, boom up/down .....	8-10 ft-lbs / 10-15 Nm
6	Check valve .....	BF .....	Differential sensing circuit, boom extend/retract .....	8-10 ft-lbs / 10-15 Nm
7	Relief valve, 1950 psi / 134 bar .....	BG .....	Extend cylinder relief .....	20-25 ft-lbs / 27-34 Nm
8	Solenoid valve, 2 position 3 way .....	BH .....	Platform level up/down .....	26-30 ft-lbs / 35-40 Nm
9	Solenoid valve, 2 position 3 way .....	BI .....	Platform level up/down .....	26-30 ft-lbs / 35-40 Nm
10	Check valve .....	BJ .....	Platform rotate circuit prevents fluid from draining back to tank .....	20-25 ft-lbs / 27-34 Nm
11	Valve, differential sensing .....	BK .....	Turntable rotate circuit .....	30-35 ft-lbs / 41-47 Nm
12	Flow regulator valve, 0.1 gpm / 0.38 L/min .....	BL .....	Bleeds off differential sensing valves to tank .....	20-25 ft-lbs / 27-34 Nm
13	Valve, differential sensing .....	BM .....	Boom up/down circuit .....	30-35 ft-lbs / 41-47 Nm
14	Flow regulator valve, 2.0 gpm / 7.6 L/min .....	BN .....	Steer left/right circuit .....	30-35 ft-lbs / 41-47 Nm
15	Check valve .....	BO .....	Platform level up .....	20-25 ft-lbs / 27-34 Nm
16	Flow regulator valve .....	BP .....	Bleeds off differential sensing valves to tank .....	30-35 ft-lbs / 41-47 Nm

**This list continues. Please turn the page**

# MANIFOLDS

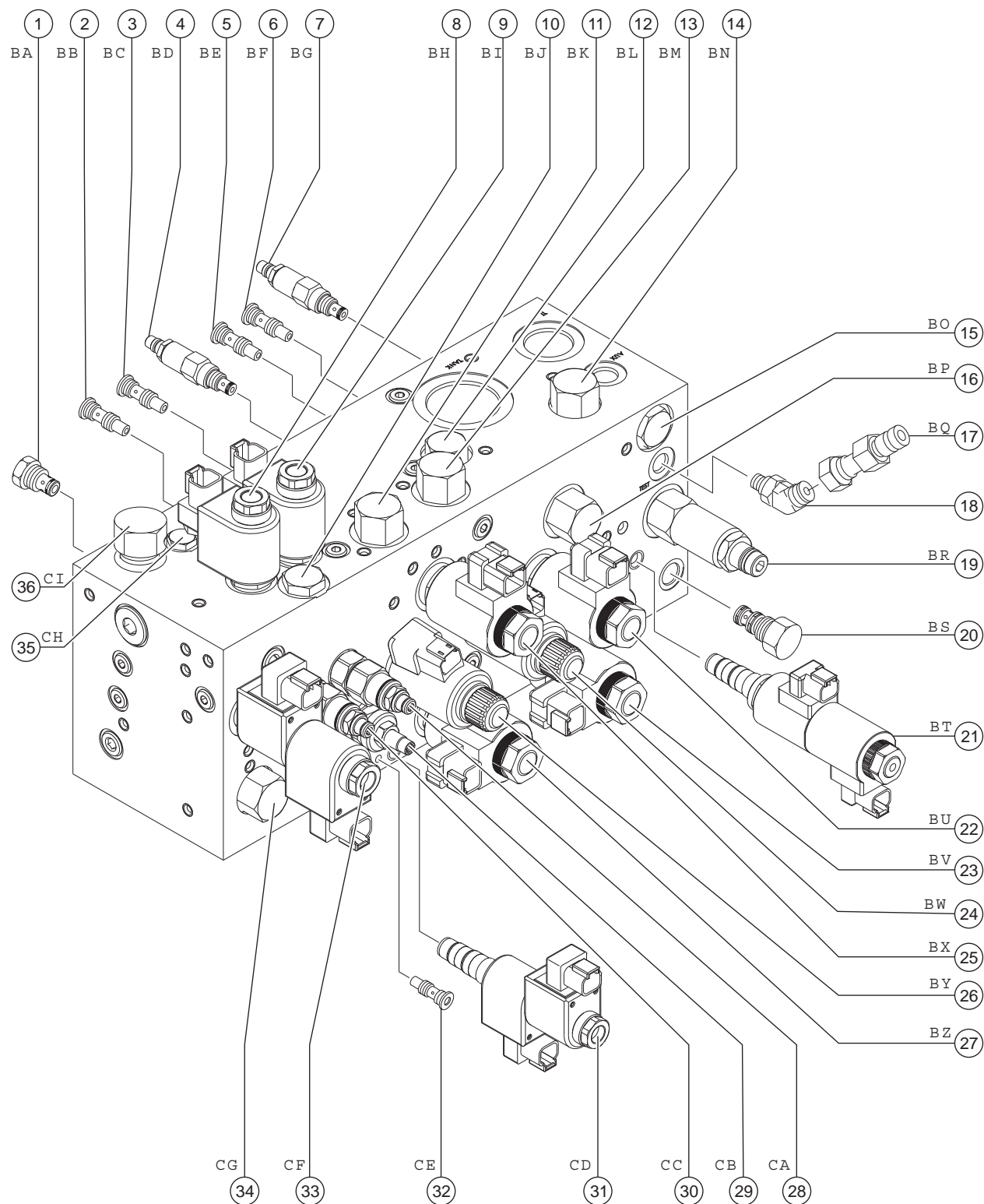


## MANIFOLDS

**Function Manifold Components**, continued

Index No.	Description	Schematic Item	Function	Torque
18	Diagnostic nipple .....	BQ .....	Testing .....	Test port
19	Relief valve, 2900 psi / 200 bar .....	BR .....	System relief (S-45) .....	30-35 ft-lbs / 41-47 Nm
	Relief valve, 2600 psi / 179 bar .....	BR .....	System relief (S-40) .....	30-35 ft-lbs / 41-47 Nm
20	Check valve .....	BS .....	Blocks flow from auxiliary pump to function pump .....	30-35 ft-lbs / 41-47 Nm
21	Solenoid valve, 3 position 4 way .....	BT .....	Steer left/right .....	26-30 ft-lbs / 35-40 Nm
22	Solenoid valve, 2 position 3 way .....	BU .....	Boom extend .....	33-37 ft-lbs / 45-50 Nm
23	Solenoid valve, 2 position 3 way .....	BV .....	Boom retract .....	33-37 ft-lbs / 45-50 Nm
24	Proportional solenoid valve .....	BW .....	Boom up/down circuit .....	20-25 ft-lbs / 27-34 Nm
25	Solenoid valve, 2 position 3 way .....	BX .....	Boom up .....	33-37 ft-lbs / 45-50 Nm
26	Proportional valve .....	BY .....	Turntable rotate left/right .....	20-25 ft-lbs / 27-34 Nm
27	Solenoid valve, 2 position 3 way .....	BZ .....	Boom down .....	33-37 ft-lbs / 45-50 Nm
28	Counterbalance valve .....	BAA .....	Platform level up .....	30-35 ft-lbs / 41-47 Nm
29	Pressure regulator valve .....	BAB .....	Platform level circuit .....	33-37 ft-lbs / 45-50 Nm
30	Counterbalance valve .....	BAC .....	Platform level down .....	30-35 ft-lbs / 41-47 Nm
31	Solenoid valve, 3 position 4 way .....	BAD .....	Turntable rotate left/right (S-45) .....	26-30 ft-lbs / 35-40 Nm
32	Check valve .....	BAE .....	Platform level down .....	8-10 ft-lbs / 10-15 Nm
33	Solenoid valve, 3 position 4 way .....	BAF .....	Platform rotate and jib boom up/down .....	26-30 ft-lbs / 35-40 Nm
34	Differential sensing valve, 150 psi / 10.3 bar .....	BAG .....	Differential sensing circuit, meters flow to functions .....	30-35 ft-lbs / 41-47 Nm
35	Check valve .....	BAH .....	Platform rotate circuit prevents hydraulic fluid from draining back to tank .....	20-25 ft-lbs / 27-34 Nm
36	Flow control valve 0.4 gpm / 1.5 L/min .....	BAI .....	Platform rotate (S-40) .....	20-25 ft-lbs / 27-34 Nm
36	Flow control valve, 0.6 gpm / 2.3 L/min .....	BAI .....	Platform rotate and jib boom (S-45) .	20-25 ft-lbs / 27-34 Nm

MANIFOLDS



## MANIFOLDS

**7-2****Valve Adjustments -  
Function Manifold**

---

**How to Adjust the System  
Relief Valve**

Note: Perform this procedure with the boom in the stowed position.

- 1 Connect a 0 to 5000 psi / 0 to 350 bar pressure gauge to the PTEST port on the function manifold.
- 2 Start the engine from the ground controls.
- 3 Hold the function enable/rpm select toggle switch to the high idle position. Activate and hold the boom retract toggle switch with the boom fully retracted.
- 4 Observe the pressure reading on the pressure gauge. Refer to Section 2, *Specifications*.
- 5 Turn the engine off. Use a wrench to hold the relief valve and remove the cap (item BR).
- 6 Adjust the internal hex socket. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the relief valve cap.

**⚠WARNING** Tip-over hazard. Do not adjust the relief valve higher than specified.

- 7 Repeat steps 2 through 5 and recheck relief valve pressure.
- 8 Remove the pressure gauge.

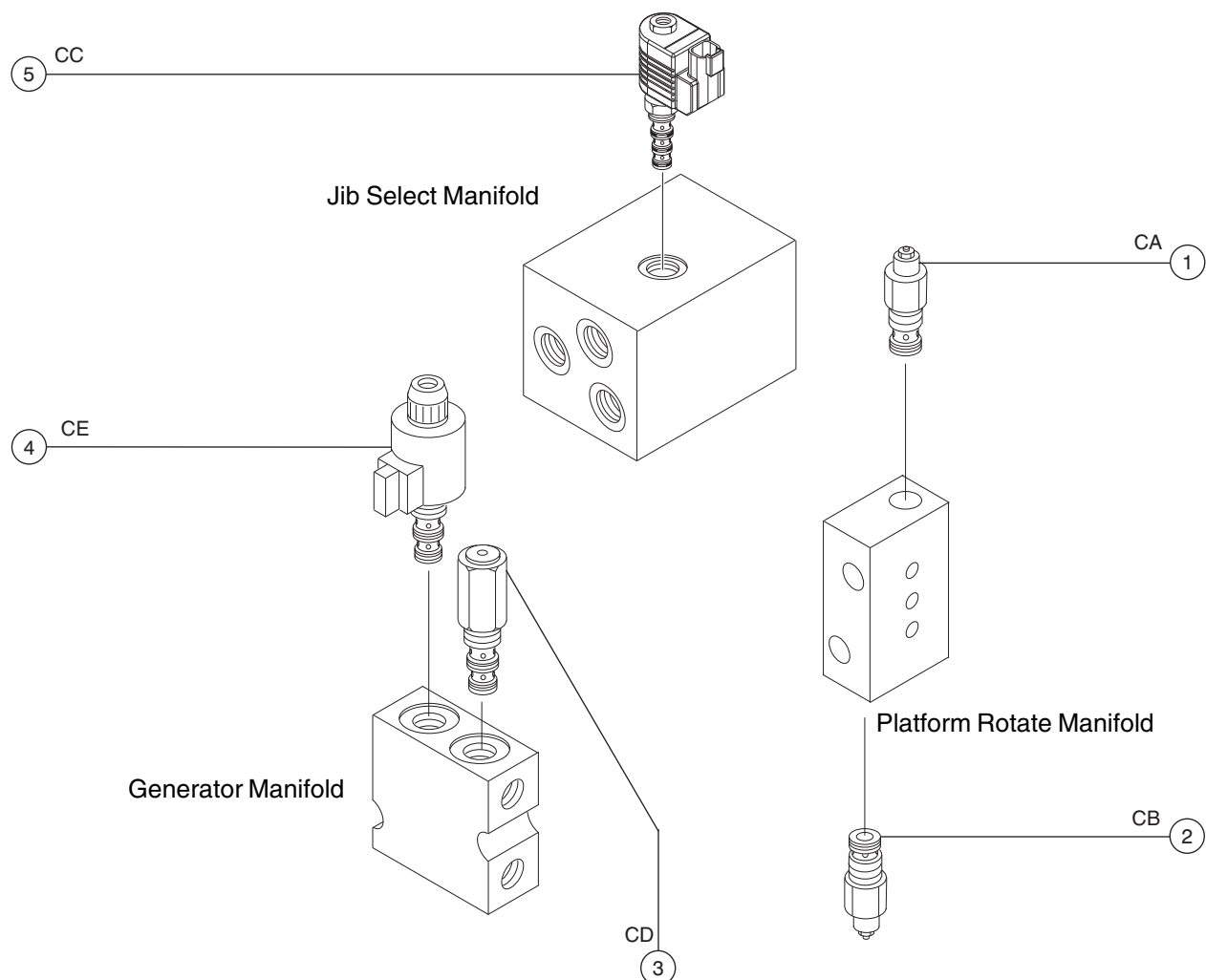


## MANIFOLDS

## 7-3

**Jib Select, Platform Rotate and Generator Manifold Components**

Index No.	Description	Schematic Item	Function	Torque
1	Counterbalance valve .....	CA .....	Platform rotate right .....	30-35 ft-lbs / 41-47 Nm
2	Counterbalance valve .....	CB .....	Platform rotate left .....	30-35 ft-lbs / 41-47 Nm
3	Relief valve .....	CD .....	Generator overload relief .....	30-35 ft-lbs / 41-47 Nm
4	Solenoid valve .....	CE .....	Controls generator on / off .....	50-55 ft-lbs / 68-75 Nm
5	Solenoid valve, 2 position 3 way .....	CC .....	Platform rotate/jib boom select .....	18-20 ft-lbs / 25-27 Nm

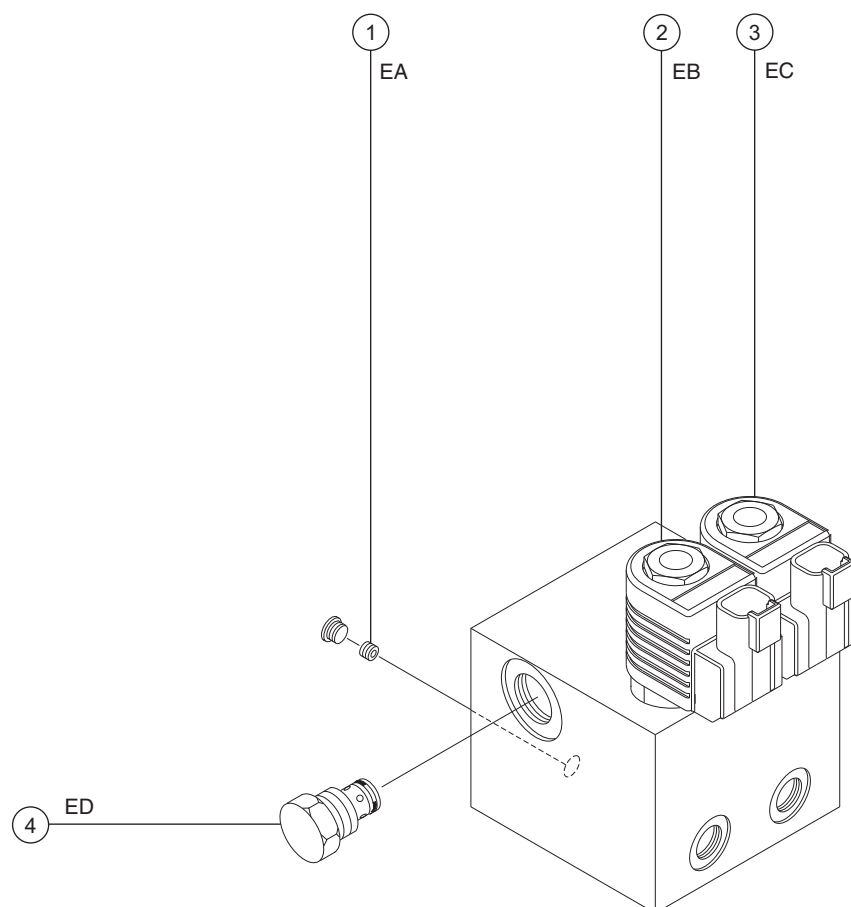


## MANIFOLDS

## 7-4

### Brake/Two-Speed Manifold Components

Index No.	Description	Schematic Item	Function	Torque
1	Orifice, 0.025 inch / 0.63 mm .....	EA .....	Turntable rotation brake release	
2	Solenoid valve, 2 position 3 way ...	EB .....	Brake release .....	20-25 ft-lbs / 27-34 Nm
3	Solenoid valve, 2 position 3 way ...	EC .....	Two-speed motor shift .....	20-25 ft-lbs / 27-34 Nm
4	Check valve .....	ED .....	Brake release circuit .....	20-25 ft-lbs / 27-34 Nm



## MANIFOLDS

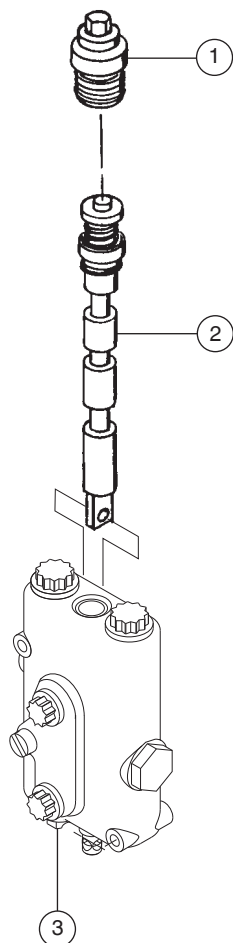
## 7-5

**Oscillate Directional Valve Components**

The oscillate directional valve is mounted inside the drive chassis at the non-steer end.

**Index**

<b>No.</b>	<b>Description</b>	<b>Function</b>	<b>Torque</b>
1	Cap .....	Breather .....	20-25 ft-lbs / 27-33 Nm
2	Spool valve .....	Directional control	
2	Relief valve .....	Pressure adjustment	



## MANIFOLDS

## How to Set Up the Oscillate Directional Valve

Note: Adjustment of the oscillate directional valve linkage is only necessary when the linkage or valve has been replaced.

Note: It will take two persons to perform this procedure.

- 1 Lower the boom to the stowed position.
- 2 Use a "bubble type" level to be sure the floor is completely level.

**WARNING** Tip-over hazard. Failure to perform this procedure on a level floor could compromise the stability of the machine resulting in the machine tipping over.

- 3 Check the tire pressure in all four tires and add air if needed to meet specification.

Note: The tires on some machines are foam-filled and do not need air added to them.

- 4 Remove the drive chassis non-steer axle cover.
- 5 Loosen the lock nuts on both sides of the adjusting rod.
- 6 Remove the clevis pin and clevis from the axle mount.
- 7 To level the drive chassis, start the engine, select high idle and push up or pull down on the threaded rod until the machine is completely level.

Note: It may be necessary to increase the pressure of the oscillate relief valve temporarily to allow the chassis to level. Do not raise the pressure higher than 1500 psi. Reset the relief valve pressure to 950 psi. Refer to 7-6, *Valve Adjustments - Oscillate Relief Valve*.

**WARNING** Tip-over hazard. Do not operate the machine when the relief valve pressure is greater than 950 psi.

- 8 Verify that the drive chassis is completely level.
- 9 Turn the adjusting rod until the clevis lines up with the axle mount.
- 10 Install the clevis pin and secure with a cotter pin.
- 11 Tighten the nuts on both sides of the adjusting rod until they are snug. Tighten the locknuts.
- 12 Verify that the drive chassis is completely level.
- 13 Measure the distance between the drive chassis and the non-steer axle on both sides (from the inside of the drive chassis).

Note: The gap between the drive chassis and the non-steer axle should be 0.150 to 0.170 inches at the narrowest point.

Note: If the distance is not between 0.150 and 0.170 inches and the adjustment to the linkage was completed with the ground and drive chassis level, repeat steps 6 through 11 OR consult Genie Service Department.

## MANIFOLDS

## 7-6 Valve Adjustments - Oscillate Relief Valve

### How to Adjust the Oscillate Relief Valve Pressure

Note: It will take two persons to perform this procedure.

- 1 Remove the drive chassis cover from the non-steer end of the machine.
- 2 Connect a 0 to 2000 psi / 0 to 150 bar pressure gauge to the diagnostic nipple located near the oscillate directional valve.
- 3 Disconnect the directional valve linkage, by removing the clevis pin and clevis from the axle.
- 4 Start the engine from the platform controls. Turn the engine to high idle.
- 5 With the engine running at high idle, manually activate the valve and observe the pressure reading on the pressure gauge.
- 6 Turn the engine off.
- 7 Locate the relief valve on the bottom of the directional valve and loosen the 7/8" jam nut.
- 8 Use a 7/16" wrench and adjust the screw. Turn it clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the valve cap.

**WARNING** Tip-over hazard. Do not adjust the relief valve higher than specified.

- 9 Repeat steps 4 through 7 and manually activate the valve to confirm the valve pressure.
- 10 Turn the engine off, remove the pressure gauge, tighten the jam nut and assemble the directional valve linkage.
- 11 Install the cover on the non-steer end of the drive chassis.
- 12 Perform maintenance procedure A-9, *Test the Oscillate Axle (if equipped)* to ensure proper oscillate function.

#### Oscillate relief valve specification

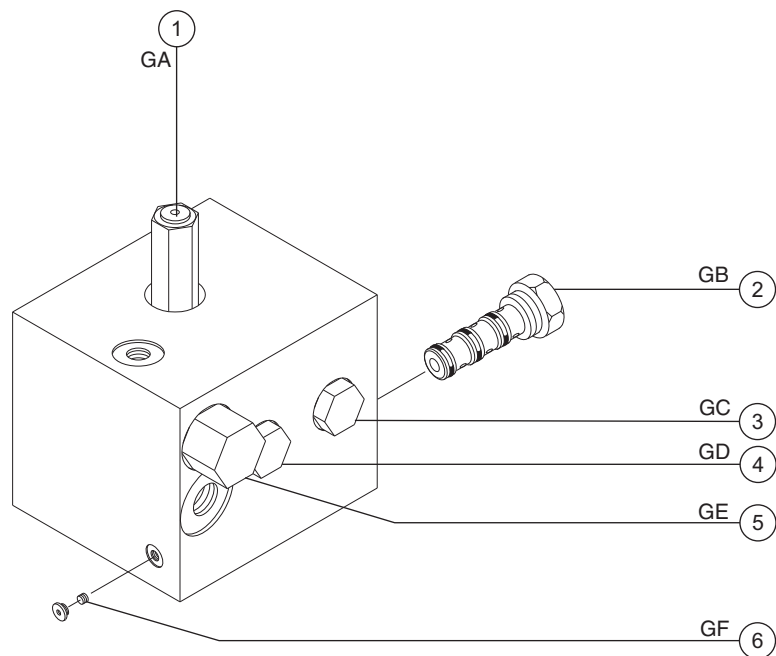
Pressure	950 psi 65.5 bar
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## MANIFOLDS

**7-7****Traction Manifold Components, 2WD**

The traction manifold is mounted inside the drive chassis at the non-steer end.

Index No.	Description	Schematic Item	Function	Torque
1	Relief valve, 280 psi / 19.3 bar .....	GA .....	Charge pressure circuit .....	30-35 ft-lbs / 41-47 Nm
2	Flow divider/combiner valve .....	GB .....	Controls flow to drive motors in forward and reverse .....	90-100 ft-lbs / 122-136 Nm
3	Check valve .....	GC .....	Drive circuit .....	30-35 ft-lbs / 41-47 Nm
4	Check valve .....	GD .....	Drive circuit .....	30-35 ft-lbs / 41-47 Nm
5	Shuttle valve, 3 position 3 way .....	GE .....	Charge pressure circuit that directs hot oil out of low pressure side of drive pump .....	50-55 ft-lbs / 68-75 Nm
6	Orifice, 0.070 inch / 1.78 mm .....	GF .....	Equalizes flow across flow divider/combiner valve (item GB)	



## MANIFOLDS

## 7-8 Valve Adjustments, 2WD Drive Manifold

### How to Adjust the Hot Oil Shuttle Relief Valve

Note: The pressure differential between the charge pump relief valve (located in the drive pump) and the hot oil shuttle relief valve (located in the drive manifold) is necessary to return hot oil from the closed loop drive circuit to the hydraulic tank for cooling. This pressure differential must be maintained at 40 psi / 14.5 bar.

Note: The following procedure will require two people.

- 1 Open the engine side turntable cover and connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the diagnostic nipple on the drive pump.
- 2 Start the engine from the platform controls and allow the engine to run at high idle. Note the pressure reading on the pressure gauge.
- 3 Turn the engine off and connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the diagnostic nipple located on the drive manifold.
- 4 Start the engine from the platform controls and drive the machine slowly in the forward direction. Note the pressure reading on the pressure gauge.
- 5 Turn the engine off, and remove the hot oil shuttle relief valve cap (item GA). Adjust the internal hex socket clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the valve cap.
- 6 Repeat steps 4 and 5 until the pressure reading on the gauge is 40 psi / 2.8 bar less than the pressure reading at the pump.

## MANIFOLDS

## 7-9

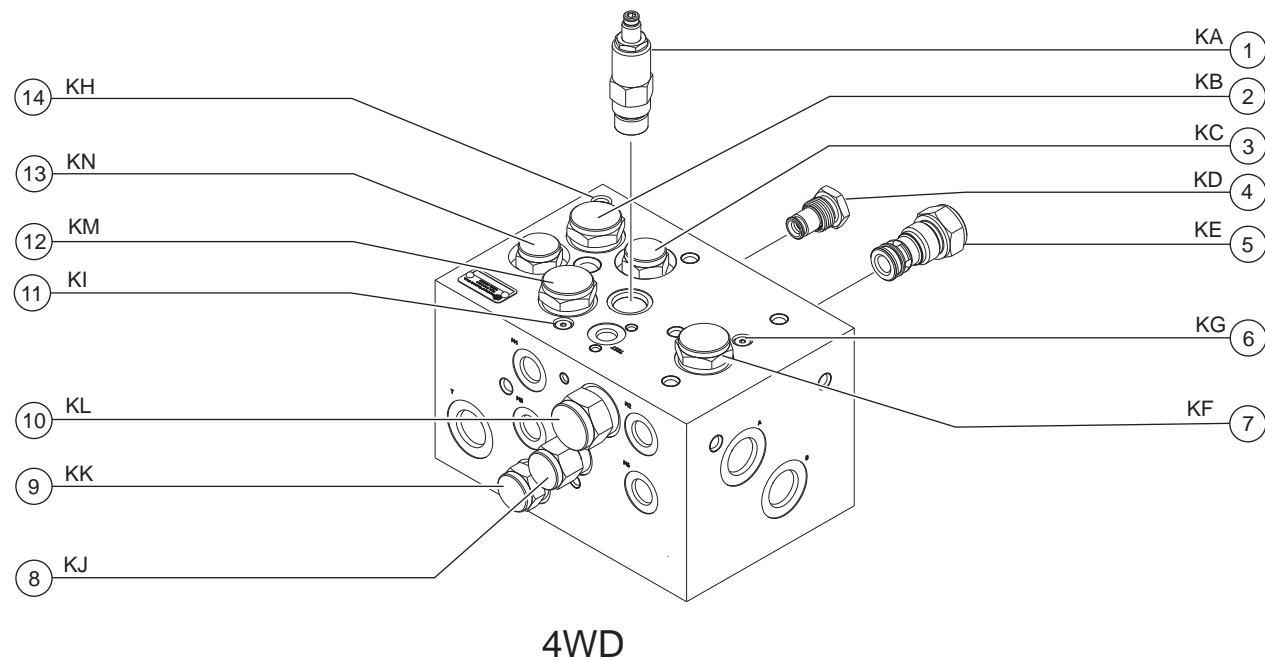
## Traction Manifold Components, 4WD

The traction manifold is mounted inside the drive chassis at the non-steer end.

Index No.	Description	Schematic Item	Function	Torque
1	Relief valve, 280 psi / 19.3 bar .....	KA .....	Charge pressure circuit .....	55-60 ft-lbs / 74-81 Nm
2	Flow divider/combiner valve .....	KB .....	Controls flow to non-steer end drive motors in forward and reverse .....	80-90 ft-lbs / 108-122 Nm
3	Check valve .....	KC .....	Steer end drive motor circuit .....	55-60 ft-lbs / 74-81 Nm
4	Check valve .....	KD .....	Non-steer end drive motor circuit .....	55-60 ft-lbs / 74-81 Nm
5	Check valve .....	KE .....	Non-steer end drive motor circuit .....	80-90 ft-lbs / 108-122 Nm
6	Orifice, 0.040 inch / 1 mm .....	KG .....	Equalizes pressure on both sides of flow divider/combiner valve 7	
7	Flow divider/combiner valve .....	KF .....	Controls flow to flow divider/combiner valves 2 and 12 .....	80-90 ft-lbs / 108-122 Nm
8	Shuttle valve, 3 position 3 way .....	KJ .....	Charge pressure circuit that directs hot oil out of low pressure side of drive pump .....	55-60 ft-lbs / 95-100 Nm
9	Check valve .....	KK .....	Steer end drive motor circuit .....	55-60 ft-lbs / 95-100 Nm
10	Check valve .....	KL .....	Steer end drive motor circuit .....	80-90 ft-lbs / 108-122 Nm
11	Orifice, 0.040 inch / 1 mm .....	KI .....	Equalizes pressure on both sides of flow divider/combiner valve 12	
12	Flow divider/combiner valve .....	KM .....	Controls flow to steer end drive motors in forward and reverse .....	80-90 ft-lbs / 108-122 Nm
13	Check valve .....	KN .....	Non-steer end drive motor circuit .....	55-60 ft-lbs / 74-81 Nm
14	Orifice, 0.040 inch / 1 mm .....	KH .....	Equalizes pressure on both sides of flow divider/combiner valve 2	



## MANIFOLDS



**7-10****Valve Adjustments, 4WD  
Drive Manifold**

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**How to Adjust the Hot Oil Shuttle  
Relief Valve**

Note: The pressure differential between the charge pump relief valve (located in the drive pump) and the hot oil shuttle relief valve (located in the drive manifold) is necessary to return hot oil from the closed loop drive circuit to the hydraulic tank for cooling. This pressure differential must be maintained at 40 psi / 14.5 bar.

Note: The following procedure will require two people.

- 1 Open the engine side turntable cover and connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the diagnostic nipple on the drive pump.
- 2 Start the engine from the platform controls and allow the engine to run at high idle. Note the pressure reading on the pressure gauge.
- 3 Turn the engine off and connect a 0 to 600 psi / 0 to 41 bar pressure gauge to the diagnostic nipple located on the drive manifold.
- 4 Start the engine from the platform controls and drive the machine slowly in the forward direction. Note the pressure reading on the pressure gauge.
- 5 Turn the engine off, and remove the hot oil shuttle relief valve cap (item KA). Adjust the internal hex socket clockwise to increase the pressure or counterclockwise to decrease the pressure. Install the valve cap.
- 6 Repeat steps 4 and 5 until the pressure reading on the gauge is 40 psi / 2.8 bar less than the pressure reading at the pump.

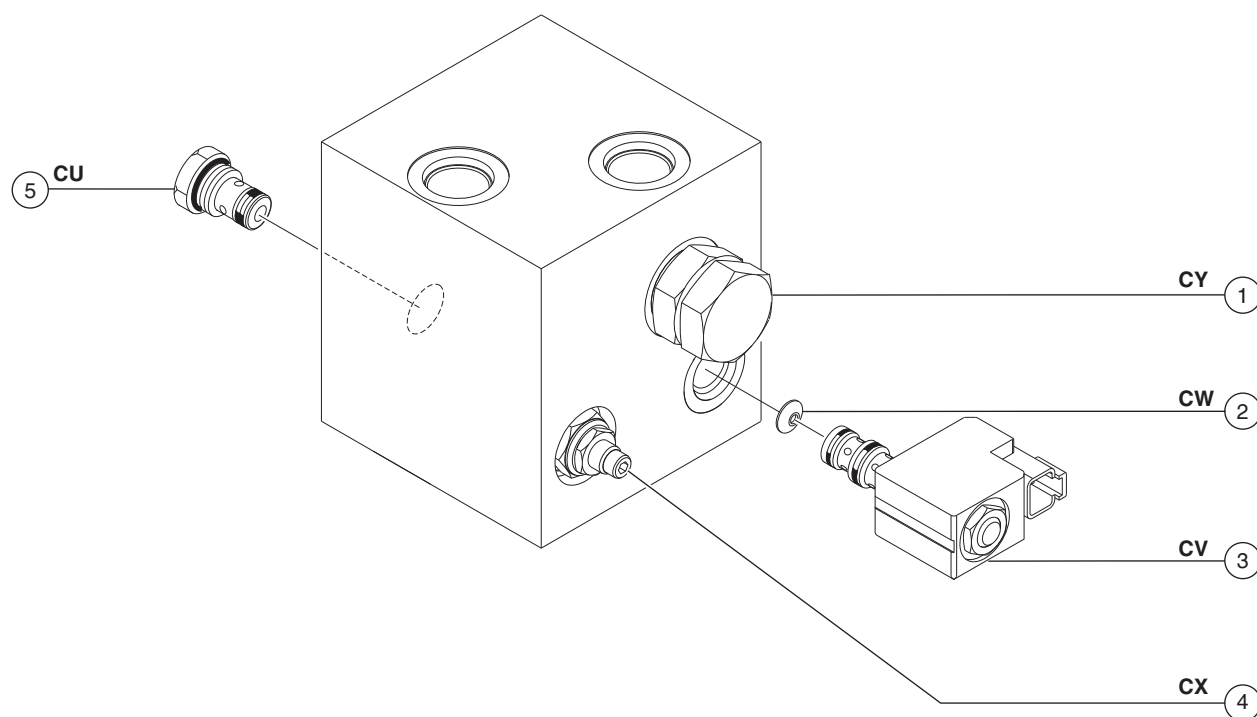
## MANIFOLDS

## 7-11

**Drive Oil Diverter Manifold Components (welder option)**

The oil diverter manifold is mounted to the hydraulic generator located in the engine compartment.

Index No.	Description	Schematic Item	Function	Torque
1	Directional Valve .....	CY .....	Diverter valve .....	80-90 ft-lbs / 108-122 Nm
2	Orifice disc .....	CW .....	Delays shift to drive .....	35-40 ft-lbs / 47-54 Nm
3	Solenoid valve .....	CV .....	Pilot valve to diverter .....	35-40 ft-lbs / 47-54 Nm
4	Relief valve .....	CX .....	Charge pressure circuit .....	35-40 ft-lbs / 47-54 Nm
5	Check valve .....	CU .....	Prevents oil to generator .....	35-40 ft-lbs / 47-54 Nm



## MANIFOLDS

## 7-12 Valve Coils

### How to Test a Coil

A properly functioning coil provides an electromagnetic force which operates the solenoid valve. Critical to normal operation is continuity within the coil. Zero resistance or infinite resistance indicates the coil has failed.

Since coil resistance is sensitive to temperature, resistance values outside specification can produce erratic operation. When coil resistance decreases below specification, amperage increases. As resistance rises above specification, voltage increases.

While valves may operate when coil resistance is outside specification, maintaining coils within specification will help ensure proper valve function over a wide range of operating temperatures.

**⚠ WARNING** Electrocuting/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Note: If the machine has been in operation, allow the coil to cool at least 3 hours before performing this test.

- 1 Tag and disconnect the wiring from the coil to be tested.
- 2 Test the coil resistance using a multimeter set to resistance ( $\Omega$ ). Refer to the Valve Coil Resistance Specification table.

✖ Result: If the resistance is not within the adjusted specification, plus or minus 10%, replace the coil.

### Valve Coil Resistance Specification

Note: The following coil resistance specifications are at an ambient temperature of 68°F / 20°C. As valve coil resistance is sensitive to changes in air temperature, the coil resistance will typically increase or decrease by 4% for each 18°F / 10°C that your air temperature increases or decreases from 68°F / 20°C.

Description	Specification
Solenoid valve, 3 position 4 way, 10V DC (schematic item BT)	4 $\Omega$
Solenoid valve, 2 position 3 way, 10V DC (schematic items BU, BV, BX, and BZ)	4 $\Omega$
Solenoid valve, 3 position 4 way, 10V DC (schematic items CD and CF)	5 $\Omega$
Proportional solenoid valve, 12V DC (schematic items BI and CH)	5 $\Omega$
Solenoid valve, 2 position 3 way, 10V DC (schematic item CC)	6.8 $\Omega$
Solenoid valve, 2 position 3 way, 12V DC (schematic items CE)	4.8 $\Omega$

## MANIFOLDS

## How to Test a Coil Diode

Genie incorporates spike suppressing diodes in all of its directional valve coils except proportional valves and those coils with a metal case. Properly functioning coil diodes protect the electrical circuit by suppressing voltage spikes. Voltage spikes naturally occur within a function circuit following the interruption of electrical current to a coil. Faulty diodes can fail to protect the electrical system, resulting in a tripped circuit breaker or component damage.

**⚠ WARNING** Electrocuting/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

- 1 Test the coil for resistance. See, *How to Test a Coil*.
- 2 Connect a 10Ω resistor to the negative terminal of a known good 9V DC battery. Connect the other end of the resistor to a terminal on the coil.

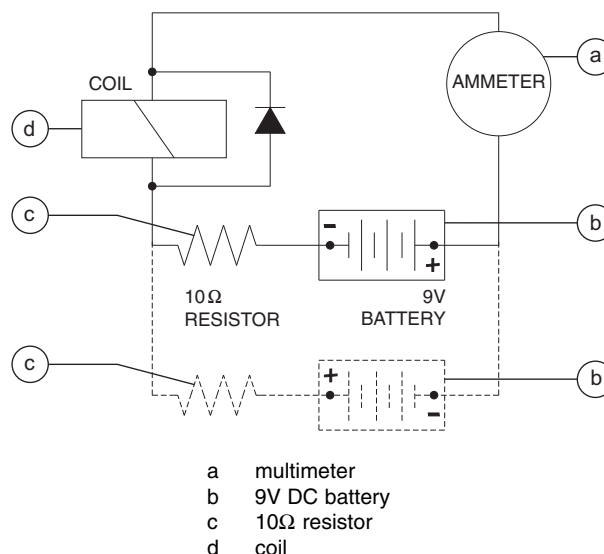
### Resistor, 10Ω

Genie part number 27287

Note: The battery should read 9V DC or more when measured across the terminals.

- 3 Set a multimeter to read DC current.

Note: The multimeter, when set to read DC current, should be capable of reading up to 800 mA.



Note: Dotted lines in illustration indicate a reversed connection as specified in step 6

- 4 Connect the negative lead to the other terminal on the coil.

Note: If testing a single-terminal coil, connect the negative lead to the internal metallic ring at either end of the coil.

- 5 Momentarily connect the positive lead from the multimeter to the positive terminal on the 9V DC battery. Note and record the current reading.
  - 6 At the battery or coil terminals, reverse the connections. Note and record the current reading.
- ⊙ Result: Both current readings are greater than 0 mA and are different by a minimum of 20%. The coil is good.
  - ⊙ Result: If one or both of the current readings are 0 mA, or if the two current readings do not differ by a minimum of 20%, the coil and/or its internal diode are faulty and the coil should be replaced.

# Turntable Rotation Components

## 8-1 Turntable Rotation Assembly

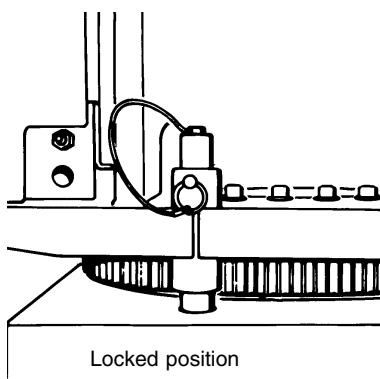
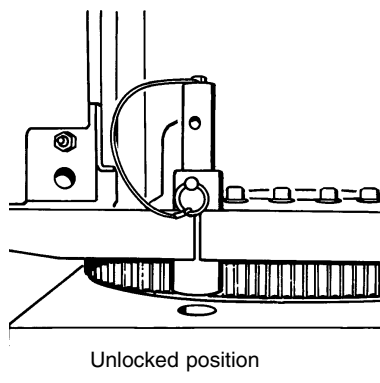
### How to Remove the Turntable Rotation Assembly

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section 2, *Hydraulic Hose and Fitting Torque Specifications*.

Note: Perform this procedure with the machine on a firm and level surface.

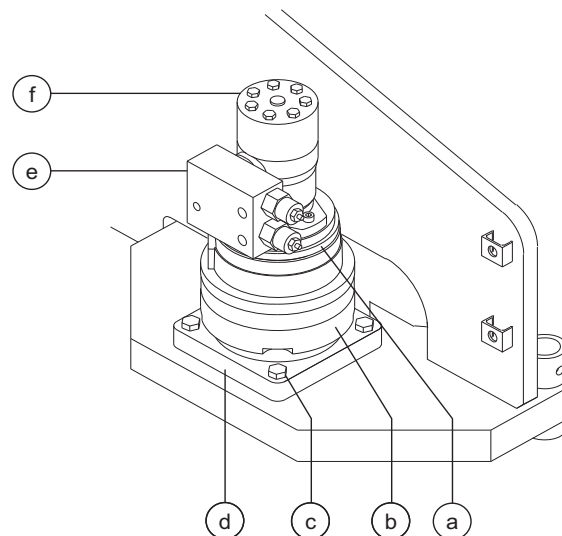
- 1 Secure the turntable from rotating with the turntable rotation lock pin.



- 2 Tag, disconnect and plug the hydraulic hoses from the motor, brake and manifold. Cap the fittings on the motor, brake and manifold.

**WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 3 Attach a suitable lifting device to the turntable rotator assembly.



- a brake assembly
- b drive hub
- c backlash plate mounting bolts
- d backlash plate
- e manifold
- f motor

## TURNTABLE ROTATION COMPONENTS

- 4 Remove the turntable rotation assembly mounting fasteners.
- 5 Carefully remove the turntable rotation assembly from the machine.

**⚠WARNING** Crushing hazard. The turntable could rotate unexpectedly when the rotation drive hub assembly is removed if the turntable is not secured with the turntable rotation lock pin.

**⚠WARNING** Crushing hazard. The turntable rotation drive hub assembly could become unbalanced and fall when removed from the machine if not properly supported.

**When installing the drive hub assembly:**

- 6 Install the drive hub. Apply Loctite® removable thread sealant and torque the backlash plate mounting fasteners to 160 ft-lbs / 217 Nm.

# Axle Components

## 9-1

### Oscillate Cylinders

The oscillating axle cylinders extend and retract between the drive chassis and the axle to maintain a level chassis while driving over uneven terrain. The cylinders are equipped with counterbalance valves to prevent movement in the event of a hydraulic hose failure.

### How to Remove an Oscillating Axle Cylinder

**⚠ WARNING** Bodily injury hazard. This procedure requires specific repair skills and a suitable workshop. Attempting this procedure without these skills and tools could result in death or serious injury and significant component damage. Dealer service is strongly recommended.

Note: Perform this procedure on a firm, level surface with the boom in the stowed position.

Note: When removing a hose assembly or fitting, the O-ring on the fitting and/or hose end must be replaced and then torqued to specification during installation.

Refer to Section Two, *Hydraulic Hose and Fitting Torque Specifications*.

- 1 Rotate the turntable until the boom is between the steer tires.

- 2 Remove the fasteners from drive chassis cover at the steer end. Remove the cover.
- 3 Tag, disconnect and plug the oscillating axle cylinder hydraulic hoses. Cap the fittings on the oscillate cylinder.

**⚠ WARNING** Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

- 4 Remove the pin retaining fasteners from the rod-end pivot pin. Use a soft metal drift to remove the pin.
- 5 Attach a lifting strap from an overhead crane to the barrel end of the oscillating cylinder.
- 6 Remove the pin retaining fasteners from the barrel-end pivot pin. Use a soft metal drift to remove the pin.
- 7 Remove the cylinder from the machine.

**⚠ WARNING** Crushing hazard. The oscillate cylinder could become unbalanced and fall when it is removed from the machine if it is not properly attached to the overhead crane.



# Track Components

## 10-1

### Track Assembly - TRAX option

#### How to Remove a Track Assembly

Note: Perform this procedure on a firm, level surface with the boom in the stowed position.

- 1 Chock the tracks at the opposite end of the machine to prevent the machine from rolling.
- 2 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the tracks.
- 3 Lift the machine until the tracks are off the ground and then place jack stands under the drive chassis for support.
- 4 Remove the lug nut bolts holding each half sprocket on the drive hub. Rotate the sprockets until only one sprocket is contacting the track. Remove the lower half sprocket from the track assembly.
- 5 Rotate the remaining half sprocket 180° so that it is free of the track.
- 6 Attach a lifting strap from an overhead crane to the center-point of the track assembly, above the sprocket.
- 7 Remove the fasteners holding the TRAX mounting pin located underneath the axle. Remove the pin supporting the TRAX assembly.
- 8 Carefully remove the track assembly from the drive hub and set aside.

**CAUTION** Crushing hazard. The track assembly could become unbalanced and fall when removed from the machine if not properly supported by the overhead crane.

#### How to Replace the Track

Note: The sprocket is comprised of two halves.

- 1 Center a lifting jack of ample capacity (20,000 lbs / 10,000 kg) under the drive chassis between the tracks.
- 2 Refer to illustration 1 and place the drive hub disconnect cap in the brake disengaged position.

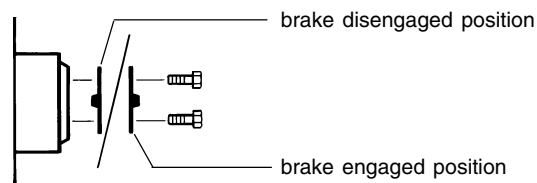


Illustration 1

- 3 Lift the machine until the tracks are off the ground and then place jack stands under the drive chassis for support.
- 4 Loosen the idler axle bolt, tensioner jam nut and tension nut on both sides of the assembly to allow maximum play in the tensioner wheel.
- 5 Remove the lug nut bolts holding each half sprocket on the drive hub. Rotate the sprockets until only one sprocket is contacting the track. Remove the lower half sprocket from the track assembly.
- 6 Rotate the remaining half sprocket 180° so that it is free of the track.
- 7 Carefully remove the track from the undercarriage.

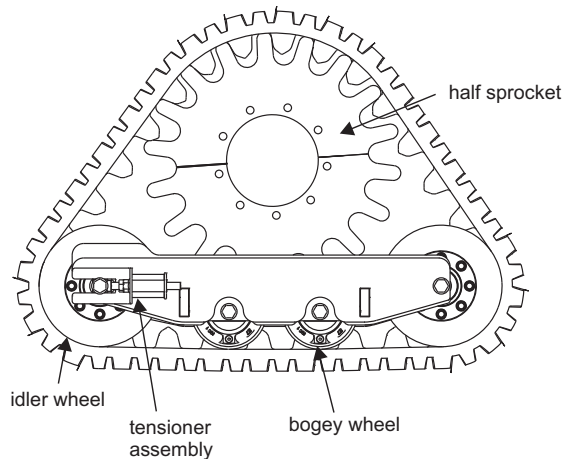


Illustration 2

- 8 Install the new track onto the undercarriage.

Note: Be sure the idler and bogey wheels are aligned with the inside surface of the track.

- 9 Using a suitable lifting device, lift up on the rubber track and rotate the half sprocket until one of the sprocket teeth is engaging the track.
- 10 Continue rotating the half sprocket until it is fully engaging the track.

- 11 Install the other sprocket half, removed in step 4.

- 12 Install the lug nuts onto the wheel hub and torque to specification. Refer to Section 2, *Specifications*.

- 13 Adjust the track tension. Tighten the tensioner nut on both sides of the idler wheel until there is about 0.75 - 1.0 inch / 19 - 25 mm of droop between the inside of the rubber track and the bottom surface of the bogey wheels.

Note: Make sure that both sides of the track have the same amount of clearance between the rollers and the track.

- 14 Tighten the jam nuts and idler axle bolts on both tensioner assemblies.

# Generators

## 11-1

### Hydraulic Generator

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#### How to Purge the Hydraulic Line on the MTE Generator

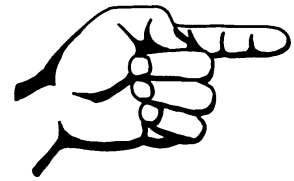
**⚠ WARNING** Electrocution hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Note: This procedure should be performed if the hydraulic line to the generator has been removed.

Note: Perform this procedure with the machine on a firm, level surface.

- 1 Locate the blue purge wire with the male spade connector from the MTE generator harness.
  - 2 Connect a jumper wire of sufficient length from the positive battery terminal to the spade connector on the purge wire.
  - 3 Start the engine and turn on the generator. Allow the generator to run for three minutes.
  - 4 Turn off the generator and turn off the engine.
  - 5 Remove the jumper wire from the positive battery terminal and disconnect from the purge wire.
  - 6 Start the engine and turn on the generator. Using a digital multimeter check the voltage at the outlet.
- ⊙ Result: The generator produces a voltage  $\pm 10\%$  of rated output. The generator is ready for use.
- ✗ Result: The generator output voltage is outside the  $\pm 10\%$  voltage range. Repeat the procedure beginning with step 2.

## GENERATORS



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# Fault Codes



## Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.
- ☑ Unless otherwise specified, perform each repair procedure with the machine in the following configuration:
  - Machine parked on a firm, level surface
  - Boom in stowed position
  - Turntable rotated with the boom between the non-steer wheels
  - Turntable secured with the turntable rotation lock
  - Key switch in the off position with the key removed
  - Wheels chocked
  - All external AC power disconnected from the machine

## Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate operator's manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.
- ☑ Read each appropriate fault code thoroughly. Attempting shortcuts may produce hazardous conditions.
- ☑ Be aware of the following hazards and follow generally accepted safe workshop practices.

### **WARNING**

Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

Note: Two persons may be required to safely perform some troubleshooting procedures.

## Control System Fault Codes

### Control System

#### How to Retrieve Control System Fault Codes

At least one fault code is present when the alarm at the platform controls produces two short beeps every 30 seconds for 10 minutes.

Perform this procedure with the engine off, the key switch turned to platform controls and the red Emergency Stop button pulled out to the on position at both the ground and platform controls.

- 1 Open the platform control box lid.

**WARNING** Electrocuting/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

- 2 Locate the red and yellow fault LEDs on the ALC-500 circuit board inside the platform control box. Do not touch the circuit board.

**NOTICE** Component damage hazard. Electrostatic discharge (ESD) can damage printed circuit board components. If the circuit board does need to be handled, maintain firm contact with a metal part of the machine that is grounded at all times when handling the printed circuit board OR use a grounded wrist strap.

- 3 **Determine the error source:** The red LED indicates the error source and will flash two separate codes. The first code will indicate the first digit of the two digit code, flashing once per second. It will then pause for 1.5 seconds and flash the second digit once per 0.5 second.

Note: When the red LED is flashing the code, the yellow LED will be on solid.

- 4 **Determine the error type:** The yellow LED indicates the error type and will flash two separate codes. The first code will indicate the first digit of the two digit code, flashing once per second. It will then pause for 1.5 seconds and flash the second digit once per 0.5 second.

Note: When the yellow LED is flashing the code, the red LED will be on solid.

- 5 Use the fault code table on the following pages to aid in troubleshooting the machine by pinpointing the area or component affected.

## Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
21	Boom 1 Joystick (primary boom up/ down)	11	Value at 5V	Function is inoperative until joystick is calibrated. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated	Function is inoperative until joystick is calibrated.	Calibrate joystick
22	Boom 1 directional valves	21	Fault	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
23	Boom 1 flow control valve	12 15	Value too high Value too low	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		17	Not calibrated	Normal function <b>except</b> threshold for one or both directions is zero.	Calibrate valve thresholds
24	Boom 1 angle sensor	11	Value at 5V	Reduced speed.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		31	Invalid setup	Initiate 1 second beep of alarm.	Calibrate angle sensor.
31	Boom 2 Joystick (secondary boom up/down or primary boom extend/retract)	11	Value at 5V	Joystick is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated	Function is inoperative until joystick is calibrated.	Calibrate joystick
32	Boom 2 directional valves	21	Fault	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.

## Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
33	Boom 2 flow control valve	12	Value too high	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		15	Value too low		
		17	Not calibrated	Normal function <b>except</b> threshold for one or both directions is zero.	Calibrate valve thresholds
41	Turntable rotate joystick	11	Value at 5V	Joystick is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V	Function is inoperative until joystick is calibrated.	Calibrate joystick
42	Turntable rotate directional valves	21	Fault	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
43	Turntable rotate flow control valve	12	Value too high	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		15	Value too low		
		17	Not calibrated	Normal function <b>except</b> threshold for one or both directions is zero.	Calibrate valve thresholds.
44	Drive enable toggle switch	21	Fault	Drive enable function is inoperative.	Cycle power off, then on and problem should be corrected.



## Control System Fault Codes

Error Source		Error Type		Condition	Solution
ID	Name	ID	Name		
51	Drive joystick	11	Value at 5V	Joystick is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated	Function is inoperative until joystick is calibrated.	Calibrate joystick
53	Drive flow valve (EDC)	12	Value too high	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		15	Value too low		
		17	Not calibrated	Normal function <b>except</b> threshold for one or both directions is zero.	Calibrate valve thresholds
54	Drive brake valve	21	Fault	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
55	High speed drive motor Valve	21	Fault	Motor speed frozen in the low state. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
61	Steer joystick	11	Value at 5V	Joystick is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.
		12	Value too high		
		15	Value too low		
		16	Value at 0V		
		17	Not calibrated	Function is inoperative until joystick is calibrated.	Calibrate Joystick
62	Steer directional valves	21	Fault	Valve is operating outside of operational limits. Alarm sounds indicating fault.	Cycle power off, then on and problem should be corrected.

## Fault Code Display - Deutz D 2.9 L4 and Perkins 404F-22 Models

### How to Retrieve Active Engine Fault Codes

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor. One or more fault LED's will illuminate on the display located at the ground control box. The active fault code will also be displayed on the LCD screen.

Note: The Perkins 404F-22 is equipped with an engine fault LED located at the platform control box.

If an engine fault occurs that does not result in an engine shutdown, the engine rpm will go into limp home mode resulting in the loss of high rpm.

When operating from the platform, if the red Emergency Stop button is pushed in, the active fault code(s) will be erased from the display.

Start the engine from the ground control box and operate various boom functions to verify that an active engine fault occurs and is shown on the display.

Note: All faults are stored in the Previous Fault history menu. These faults will not be erased when corrective action has been completed.

### With an active fault and the engine running: (preferred method)

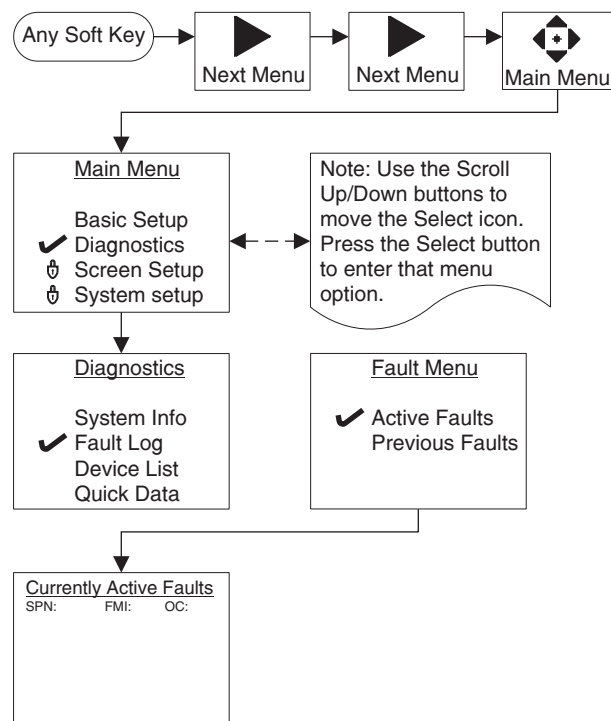
- 1 At the ground controls, activate the auxiliary pump toggle switch to shut the engine off.

Note: Do not push in the red Emergency Stop button or turn the key switch to the off position.

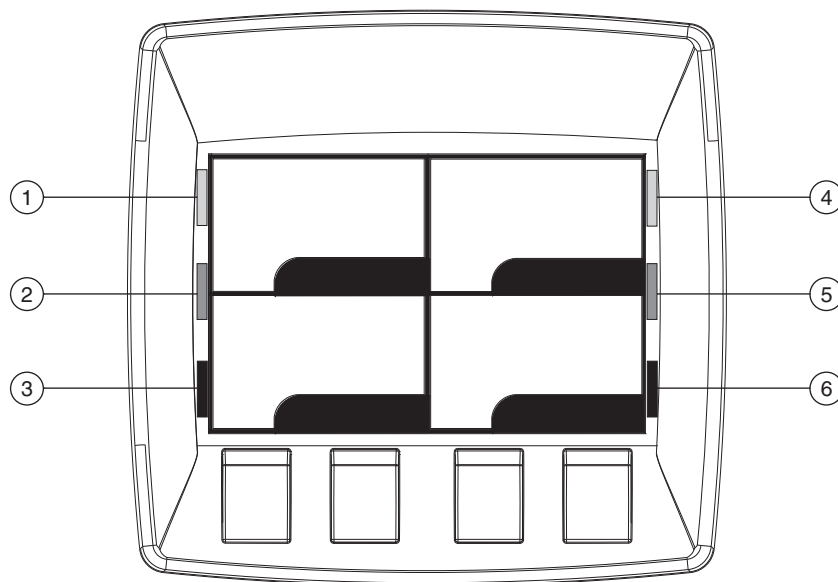
- 3 Press any soft key below the display.
- 4 Use the scroll up / down keys to check for multiple engine fault codes.

### With the engine not running:

- 1 At the ground controls, turn the key switch to ground controls and pull out the red Emergency Stop button.
- 2 Navigate to the Active Fault Menu and use the scroll up / down keys to check for multiple engine fault codes.

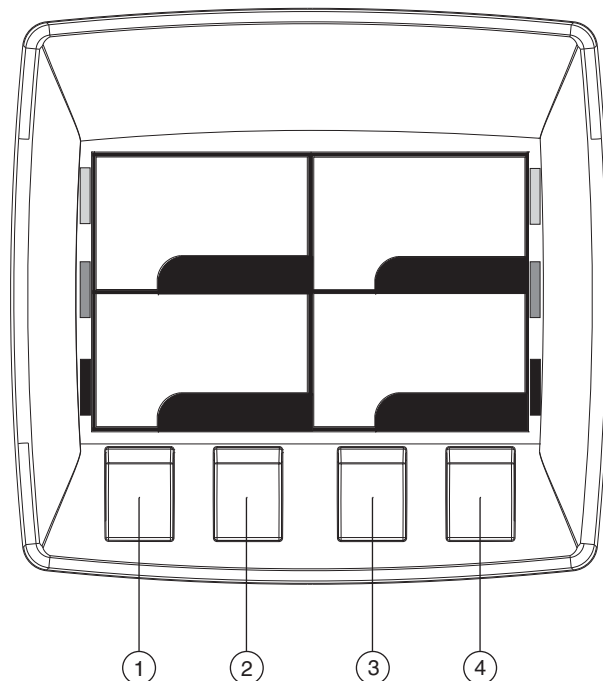


## Fault Code Display - Flashing and Solid LED's



- 1 Left green LED:  
Flashing, engine fault detected. Contact service.  
Solid, fault acknowledged. Contact service.
- 2 Left amber LED: (Perkins models)  
Solid,  
a) Regeneration is inhibited. No service required.  
b) High exhaust temperature during regeneration mode. No service required.
- 3 Left red LED:  
Flashing, engine fault detected. Contact service.  
Flashing with right flashing amber LED, engine soot level over 140%. Engine shut down. Contact service.
- 4 Right green LED:  
Flashing, engine fault detected. Contact service.  
Solid, fault acknowledged. Contact service.
- 5 Right amber LED: (Perkins models)  
Solid with left amber LED on solid, regeneration has been inhibited and engine soot level is between 80 - 100%. Regeneration is required.  
Flashing with left amber LED on solid, regeneration has been inhibited and soot level is between 100 - 140%. Engine rpm is de-rated. Regeneration is required.  
Flashing with left and right red LED's flashing, engine soot level over 140%. Engine shut down. Contact service.
- 6 Right red LED:  
Flashing, engine fault detected. Contact service.  
Flashing with right flashing amber LED, engine soot level over 140%. Engine shut down. Contact service.

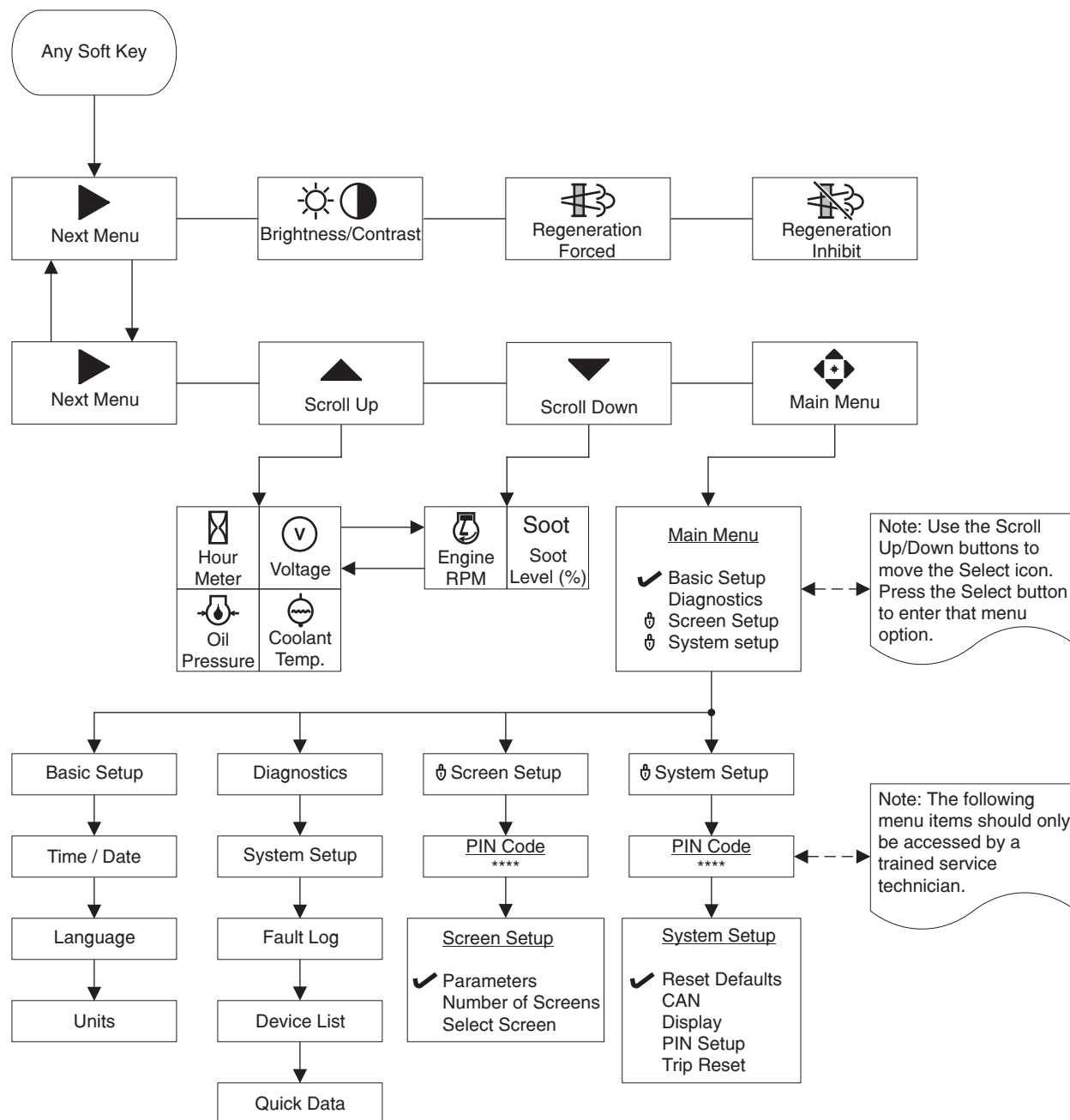
## Fault Code Display - Soft Key Functions and Icons



- 1 Next menu • Exit / Back one screen • Decrease brightness (-)
- 2 Brightness / Contrast • Scroll up • Increase • Increase brightness (+)
- 3 Regeneration forced • Scroll down • Decrease • Decrease contrast (-)
- 4 Regeneration inhibited • Select / Next • Main menu • Increase contrast (+)

Next Menu	Brightness/ Contrast	Initiate Switch	Inhibit Switch
Exit / Back One Screen	Scroll Up	Scroll Down	Select
Main Menu	Hour Meter	Oil Pressure	Coolant Temp.
Engine RPM	Soot  Soot Level Percent (%)	Voltage	Pin # Protected

## Fault Code Display - Main Menu Structure



## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
51	3	1019	EGR-Valve, short circuit to battery	51	6	1022	Actuator error EGR-Valve; signal range check high
51	3	1024	Position sensor error of actuator EGR-Valve; signal range check high	51	6	1224	Actuator EGR-Valve; over current
51	3	1226	EGR-Valve; short circuit to battery (A02)	51	6	1230	Actuator error EGR-Valve; Overload by short-circuit
51	3	1227	EGR-Valve; short circuit to battery (A67)	51	7	1016	Actuator position for EGR-Valve not plausible
51	4	1020	EGR-Valve; short circuit to ground	51	11	1231	Actuator error EGR-Valve; Power stage over temp due to high current
51	4	1025	Position sensor error actuator EGR-Valve; signal range check low	51	12	1018	Actuator EGR-Valve; powerstage over temperature
51	4	1228	EGR-Valve; short circuit to ground (A02)	51	12	1021	Mechanical actuator defect EGR-Valve
51	4	1229	EGR-Valve; short circuit to ground (A67)	51	12	1225	Actuator EGR-Valve; over temperature
51	4	1232	Actuator error EGR-Valve; Voltage below threshold	94	1	474	Low fuel pressure; warning threshold exceeded
51	5	1015	Actuator error EGR-Valve; signal range check low	94	1	475	Low fuel pressure; shut off threshold exceeded
51	5	1017	Actuator EGR-Valve; open load	94	3	472	Sensor error low fuel pressure; signal range check high
51	5	1023	Actuator error EGR-Valve; signal range check low	94	4	473	Sensor error low fuel pressure; signal range check low
51	5	1223	Actuator EGR-Valve; open load	97	3	464	Sensor error water in fuel; signal range check high
51	6	1014	Actuator error EGR-Valve; signal range check high	97	4	465	Sensor error water in fuel; signal range check low
				97	12	1157	Water in fuel level prefilter; maximum value exceeded

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
100	0	734	High oil pressure; warning threshold exceeded	108	3	412	Sensor error ambient air press.; signal range check high
100	0	735	High oil pressure; shut off threshold exceeded	108	4	413	Sensor error ambient air press.; signal range check low
100	1	736	Low oil pressure; warning threshold exceeded	110	0	98	High coolant temperature; warning threshold exceeded
100	1	737	Low oil pressure; shut off threshold exceeded	110	0	99	High coolant temperature; shut off threshold exceeded
100	3	732	Sensor error oil pressure; signal range check high	110	3	96	Sensor error coolant temp.; signal range check high
100	4	733	Sensor error oil pressure sensor; signal range check low	110	4	97	Sensor error coolant temp.; signal range check low
102	2	88	Charged air pressure above warning threshold	111	1	101	Coolant level too low
102	2	89	Charged air pressure above shut off threshold	132	11	1	Air flow sensor load correction factor exceeding the maximum drift limit; plausibility error
102	4	777	Sensor error charged air press.; signal range check low	132	11	2	Air flow sensor load correction factor exceeding drift limit; plausibility error
105	0	996	High charged air cooler temperature; warning threshold exceeded	132	11	3	Air flow sensor low idle correction factor exceeding the maximum drift limit
105	0	997	High charged air cooler temperature; shut off threshold exceeded	132	11	4	Air flow sensor load correction factor exceeding the maximum drift limit
105	3	994	Sensor error charged air temperature; signal range check high	157	3	877	Sensor error rail pressure; signal range check high
105	4	995	Sensor error charged air temperature; signal range check low	157	4	878	Sensor error rail pressure; signal range check low

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
168	0	1180	Physical range check high for battery voltage	174	0	481	High low fuel temperature; warning threshold exceeded
168	1	1181	Physical range check low for battery voltage	174	0	482	High Low fuel temperature; shut off threshold exceeded
168	2	47	High battery voltage; warning threshold exceeded	175	0	740	Physical range check high for oil temperature
168	2	48	Low battery voltage; warning threshold exceeded	175	0	745	High oil temperature; warning threshold exceeded
168	3	45	Sensor error battery voltage; signal range check high	175	0	746	High oil temperature; shut off threshold exceeded
168	4	46	Sensor error battery voltage; signal range check low	175	1	741	Physical range check low for oil temperature
171	3	417	Sensor error environment temperature; signal range check high	175	2	738	Sensor oil temperature; plausibility error
171	4	418	Sensor error environment temperature; signal range check low	175	2	739	Sensor oil temperature; plausibility error oil temperature too high
172	0	1182	Physical range check high for intake air temperature	175	3	743	Sensor error oil temperature; signal range check high
172	1	1183	Physical range check low for intake air temperature	175	4	744	Sensor error oil temperature; signal range check low
172	2	9	Sensor ambient air temperature; plausibility error	190	0	389	Engine speed above warning threshold (FOC-Level 1)
172	2	983	Intake air sensor; plausibility error	190	2	421	Offset angle between crank- and camshaft sensor is too large
172	3	981	Sensor error intake air; signal range check high	190	8	419	Sensor camshaft speed; disturbed signal
172	4	982	Sensor error intake air sensor; signal range check low				



## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
190	8	422	Sensor crankshaft speed; disturbed signal	412	3	1007	Sensor error EGR cooler downstream temperature; signal range check high
190	11	390	Engine speed above warning threshold (FOC-Level 2)	412	4	1008	Sensor error EGR cooler downstream temperature; signal range check low
190	12	420	Sensor camshaft speed; no signal	520	9	306	Timeout Error of CAN-Receive-Frame TSC1TR; Setpoint
190	12	423	Sensor crankshaft speed; no signal	597	2	49	Break lever mainswitch and break lever redundancyswitch status not plausible
190	14	391	Engine speed above warning threshold (Overrun Mode)	624	3	971	SVS lamp; short circuit to batt.
190	14	1222	Camshaft- and Crankshaft speed sensor signal not available on CAN	624	4	972	SVS lamp; short circuit to grd.
411	0	791	Physical range check high for differential pressure Venturiunit (EGR)	624	5	969	SVS lamp; open load
411	1	792	Physical range check low for differential pressure Venturiunit (EGR)	624	12	970	SVS lamp; powerstage over temperature
411	3	795	Sensor error differential pressure Venturiunit (EGR); signal range check high	630	12	376	Access error EEPROM memory (delete)
411	4	381	Physical range check low for EGR differential pressure	630	12	377	Access error EEPROM memory (read)
411	4	796	Sensor error differential pressure Venturiunit (EGR); signal range check low	630	12	378	Access error EEPROM memory (write)
				639	14	84	CAN-Bus 0 "BusOff-Status"
				651	3	580	Injector 1 (in firing order); short circuit
				651	4	586	High side to low side short circuit in the injector 1 (in firing order)

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
651	5	568	Injector 1 (in firing order); interruption of electric connection	677	3	956	Starter relay high side; short circuit to battery
652	3	581	Injector 2 (in firing order); short circuit	677	3	960	Starter relay low side; short circuit to battery
652	4	587	High side to low side short circuit in the injector 2 (in firing order)	677	4	957	Starter relay high side; short circuit to ground
652	5	569	Injector 2 (in firing order); interruption of electric connection	677	4	961	Starter relay low side; short circuit to ground
653	3	582	Injector 3 (in firing order); short circuit	677	5	958	Starter relay; no load error
653	4	588	High side to low side short circuit in the injector 3 (in firing order)	677	12	959	Starter relay; powerstage over temperature
653	5	570	Injector 3 (in firing order); interruption of electric connection	703	3	426	Engine running lamp; short circuit to battery
654	3	583	Injector 4 (in firing order); short circuit	703	4	427	Engine running lamp; short circuit to ground
654	4	589	High side to low side short circuit in the injector 4 (in firing order)	703	5	424	Engine running lamp; open load
654	5	571	Injector 4 (in firing order); interruption of electric connection	703	12	425	Engine running lamp; powerstage over temperature
676	11	543	Cold start aid relay error.	729	5	545	Cold start aid relay open load
676	11	544	Cold start aid relay open load	729	12	547	Cold start aid relay; over temperature error
				898	9	305	Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint
				1079	13	946	Sensor supply voltage monitor 1 error (ECU)
				1080	13	947	Sensor supply voltage monitor 2 error (ECU)

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
1109	2	121	Engine shut off demand ignored	1180	1	1463	Exhaust gas temperature upstream turbine; shut off threshold exceeded
1136	0	1398	Physikal range check high for ECU temperature	1180	3	1067	Sensor error exhaust gas temperature upstream turbine; signal range check high
1136	1	1399	Physikal range check low for ECU temperature	1180	11	1066	Sensor exhaust gas temperature upstream turbine; plausibility error
1136	3	1400	Sensor error ECU temperature; signal range check high	1188	2	1414	Wastegate; status message from ECU missing
1136	4	1401	Sensor error ECU temperature; signal range check low	1188	7	1415	Wastegate actuator; blocked
1176	3	849	Sensor error pressure sensor upstream turbine; signal range check high	1188	11	1411	Wastegate actuator; internal error
1176	4	850	Sensor error pressure sensor downstream turbine; signal range check high	1188	11	1412	Wastegate actuator; EOL calibration not performed correctly
1180	0	1193	Physical range check high for exhaust gas temperature upstream turbine	1188	11	1416	Wastegate actuator; over temperature (> 145°C)
1180	0	1460	Turbocharger Wastegate CAN feedback; warning threshold exceeded	1188	11	1417	Wastegate actuator; over temperature (> 135°C)
1180	0	1462	Exhaust gas temperature upstream turbine; warning threshold exceeded	1188	11	1418	Wastegate actuator; operating voltage error
1180	1	1194	Physical range check low for exhaust gas temperature upstream turbine	1188	13	1413	Wastegate actuator calibration deviation too large, recalibration required
1180	1	1461	Turbocharger Wastegate CAN feedback; shut off threshold exceeded	1231	14	85	CAN-Bus 1 "BusOff-Status"
				1235	14	86	CAN-Bus 2 "BusOff-Status"

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
1237	2	747	Override switch; plausibility error	2798	4	1338	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 1
1322	12	610	Too many recognized misfires in more than one cylinder	2798	4	1339	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 0
1323	12	604	Too many recognized misfires in cylinder 1 (in firing order)	2798	4	1340	Injector diagnostics; short circuit to ground monitoring Test in Cyl. Bank 1
1324	12	605	Too many recognized misfires in cylinder 2 (in firing order)	3224	2	127	DLC Error of CAN-Receive-Frame AT11G1 NOX Sensor (SCR-system upstream cat; DPF-system downstream cat); length of frame incorrect
1325	12	606	Too many recognized misfires in cylinder 3 (in firing order)	3224	9	128	Timeout Error of CAN-Receive-Frame AT11G1; NOX sensor upstream
1326	12	607	Too many recognized misfires in cylinder 4 (in firing order)	3248	4	1047	Sensor error particle filter downstream temperature; signal range check low
2659	0	1524	Physical range check high for EGR exhaust gas mass flow	3699	2	1616	DPF differential pressure sensor and a further sensor or actuator CRT system defective
2659	1	1525	Physical range check low for EGR exhaust gas mass flow	3699	2	1617	Temperature sensor us. and ds. DOC simultaneously defect
2659	2	1523	Exhaust gas recirculation AGS sensor; plausibility error	3699	14	1615	Maximum stand-still-duration reached; oil exchange required
2659	2	1527	AGS sensor temperature exhaust gas mass flow; plausibility error	4765	0	1039	Physical range check high for exhaust gas temperature upstream (DOC)
2659	12	1526	Exhaust gas recirculation; AGS sensor has "burn off" not performed	4765	1	1042	Physical range check low for exhaust gas temperature upstream (DOC)
2797	4	1337	Injector diagnostics; timeout error of short circuit to ground measurement cyl. Bank 0				

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
4766	0	1029	Physical range check high for exhaust gas temperature downstream (DOC)	523008	2	649	Timeout error in Manipulation control
4766	1	1032	Physical range check low for exhaust gas temperature downstream (DOC)	523009	9	825	Pressure Relief Valve (PRV) reached maximum allowed opening count
4768	2	1036	Sensor exhaust gas temperature upstream (DOC); plausibility error	523009	10	833	Pressure relief valve (PRV) reached maximum allowed open time
4768	3	1044	Sensor error exhaust gas temperature upstream (DOC); signal range check high	523212	9	171	Timeout Error of CAN-Receive-Frame ComEngPrt; Engine Protection
4768	4	1045	Sensor error exhaust gas temperature upstream (DOC); signal range check low	523216	9	198	Timeout Error of CAN-Receive-Frame PrHtEnCmd; pre-heat command, engine command
4769	2	1026	Sensor exhaust gas temperature downstream (DOC); plausibility error	523240	9	179	Timeout CAN-message FunModCtl; Function Mode Control
4769	3	1034	Sensor error exhaust gas temperature downstream (DOC); signal range check high	523350	4	565	Injector cylinder-bank 1; short circuit
4769	4	1035	Sensor error exhaust gas temperature downstream (DOC); signal range check low	523352	4	566	Injector cylinder-bank 2; short circuit
523006	3	34	Controller mode switch; short circuit to battery	523354	12	567	Injector powerstage output defect
523006	4	35	Controller mode switch; short circuit to ground	523470	2	826	Pressure Relief Valve (PRV) forced to open; performed by pressure increase
523008	1	648	Manipulation control was triggered	523470	2	827	Pressure Relief Valve (PRV) forced to open; performed by pressure shock

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
523470	7	876	Maximum rail pressure in limp home mode exceeded (PRV)	523612	12	613	Internal ECU monitoring detection reported error
523470	11	831	The PRV can not be opened at this operating point with a pressure shock	523612	12	614	Internal ECU monitoring detection reported error
523470	11	832	Rail pressure out of tolerance range	523612	12	615	Internal ECU monitoring detection reported error
523470	12	828	Open Pressure Relief Valve (PRV); shut off condition	523612	12	616	Internal ECU monitoring detection reported error
523470	12	829	Open Pressure Relief Valve (PRV); warning condition	523612	12	617	Internal ECU monitoring detection reported error
523470	14	830	Pressure Relief Valve (PRV) is open	523612	12	618	Internal ECU monitoring detection reported error
523550	12	980	T50 start switch active for too long	523612	12	619	Internal ECU monitoring detection reported error
523601	13	948	Sensor supply voltage monitor 3 error (ECU)	523612	12	620	Internal ECU monitoring detection reported error
523603	9	126	Timeout Error of CAN-Receive-Frame AMB; Ambient Temperature Sensor	523612	12	621	Internal ECU monitoring detection reported error
523605	9	300	Timeout Error of CAN-Receive-Frame TSC1AE; Traction Control	523612	12	623	Internal ECU monitoring detection reported error
523606	9	301	Timeout Error of CAN-Receive-Frame TSC1AR; Retarder	523612	12	624	Internal ECU monitoring detection reported error
523612	12	387	Internal software error ECU; injection cut off	523612	12	625	Internal ECU monitoring detection reported error
523612	12	612	Internal ECU monitoring detection reported error	523612	12	627	Internal ECU monitoring detection reported error
				523612	12	628	Internal ECU monitoring detection reported error

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
523612	12	637	Internal ECU monitoring detection reported error	523615	3	596	Metering unit (Fuel-System); short circuit to battery low side
523612	12	1170	Internal software error ECU	523615	4	595	Metering unit (Fuel-System); short circuit to ground high side
523612	14	973	Softwarereset CPU SWReset_0	523615	4	597	Metering Unit (Fuel-System); short circuit to ground low side
523612	14	974	Softwarereset CPU SWReset_1	523615	5	592	Metering unit (Fuel-System); open load
523612	14	975	Softwarereset CPU SWReset_2	523615	12	593	Metering unit (Fuel-System); powerstage over temperature
523613	0	856	Maximum positive deviation of rail pressure exceeded (RailMeUn0)	523619	2	488	Physical range check high for exhaust gas temperature upstream (SCR-CAT)
523613	0	857	Maximum positive deviation of rail pressure in metering unit exceeded (RailMeUn1)	523698	11	122	Shut off request from supervisory monitoring function
523613	0	858	Railsystem leakage detected (RailMeUn10)	523717	12	125	Timeout Error of CAN-Transmit-Frame AmbCon; Weather environments
523613	0	859	Maximum negative deviation of rail pressure in metering unit exceeded (RailMeUn2)	523718	3	1488	SCR mainrelay; short circuit to battery (only CV56B)
523613	0	860	Negative deviation of rail pressure second stage (RailMeUn22)	523718	4	1489	SCR mainrelay; short circuit to ground (only CV56B)
523613	0	862	Maximum rail pressure exceeded (RailMeUn4)	523718	5	1486	SCR mainrelay; open load (only CV56B)
523613	1	861	Minimum rail pressure exceeded (RailMeUn3)	523718	12	1487	SCR mainrelay; powerstage over temperature (only CV56B)
523613	2	864	Setpoint of metering unit in overrun mode not plausible	523766	9	281	Timeout Error of CAN-Receive-Frame Active TSC1AE
523615	3	594	Metering unit (Fuel-System); short circuit to battery highside	523767	9	282	Timeout Error of CAN-Receive-Frame Passive TSC1AE

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
523768	9	283	Timeout Error of CAN-Receive-Frame Active TSC1AR	523897	13	561	check of missing injector adjustment value programming (IMA) injector 3 (in firing order)
523769	9	284	Timeout Error of CAN-Receive-Frame Passive TSC1AR	523898	13	562	check of missing injector adjustment value programming (IMA) injector 4 (in firing order)
523770	9	285	Timeout Error of CAN-Receive-Frame Passive TSC1DE	523910	6	1261	Air Pump; over current
523776	9	291	Timeout Error of CAN-Receive-Frame TSC1TE - active	523913	3	74	Sensor error glow plug control diagnostic line voltage; signal range check high
523777	9	292	Passive Timeout Error of CAN-Receive-Frame TSC1TE; Setpoint	523913	4	75	Sensor error glow plug control diagnostic line voltage; signal range check low
523778	9	293	Active Timeout Error of CAN-Receive-Frame TSC1TR	523914	3	78	Glow plug control; short circuit to battery
523779	9	294	Passive Timeout Error of CAN-Receive-Frame TSC1TR	523914	4	79	Glow plug control; short circuit to ground
523788	12	299	Timeout Error of CAN-Transmit-Frame TrbCH; Status Wastegate	523914	5	76	Glow plug control; open load
523793	9	202	Timeout Error of CAN-Receive-Frame UAA10; AGS sensor service message	523914	5	1216	Glow plug control release line; short circuit error
523794	9	203	Timeout Error of CAN-Receive-Frame UAA11; AGS sensor data	523914	11	1217	Glow plug control; internal error
523895	13	559	Check of missing injector adjustment value programming (IMA) injector 1 (in firing order)	523914	12	77	Glow plug control; powerstage over temperature
523896	13	560	check of missing injector adjustment value programming (IMA) injector 2 (in firing order)	523919	2	1378	Sensor air pump air pressure; plausibility error
				523920	2	1379	Sensor exhaust gas back pressure burner; plausibility error



## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
523922	7	1262	Burner Shut Off Valve; blocked closed	523936	12	169	Timeout Error of CAN-Transmit- Frame EEC3VOL2; Engine send messages
523922	7	1264	Burner Shut Off Valve; blocked open	523946	0	1158	Zerofuel calibration injector 1 (in firing order); maximum value exceeded
523929	0	109	Fuel Balance Control integrator injector 1 (in firing order); maximum value exceeded	523946	1	1164	Zerofuel calibration injector 1 (in firing order); minimum value exceeded
523929	1	115	Fuel Balance Control integrator injector 1 (in firing order); minimum value exceeded	523947	0	1159	Zerofuel calibration injector 2 (in firing order); maximum value exceeded
523930	0	110	Fuel Balance Control integrator injector 2 (in firing order); maximum value exceeded	523947	1	1165	Zerofuel calibration injector 2 (in firing order); minimum value exceeded
523930	1	116	Fuel Balance Control integrator injector 2 (in firing order); minimum value exceeded	523948	0	1160	Zerofuel calibration injector 3 (in firing order); maximum value exceeded
523931	0	111	Fuel Balance Control integrator injector 3 (in firing order); maximum value exceeded	523948	1	1166	Zerofuel calibration injector 3 (in firing order); minimum value exceeded
523931	1	117	Fuel Balance Control integrator injector 3 (in firing order); minimum value exceeded	523949	0	1161	Zerofuel calibration injector 4 (in firing order); maximum value exceeded
523932	0	112	Fuel Balance Control integrator injector 4 (in firing order); maximum value exceeded	523949	1	1167	Zerofuel calibration injector 4 (in firing order); minimum value exceeded
523932	1	118	Fuel Balance Control integrator injector 4 (in firing order); minimum value exceeded	523960	0	1011	Physical range check high for EGR cooler downstream temp.
523935	12	168	Timeout Error of CAN-Transmit- Frame EEC3VOL1; Engine send messages				

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
523960	0	1458	High exhaust gas temperature EGR cooler downstream; warning threshold exceeded	524016	2	1259	Amount of air is not plausible to pump speed
523960	1	1012	Physical range check low for EGR cooler downstream temp.	524016	2	1260	Calculated amount of air is not plausible to HFM reading
523960	1	1459	High exhaust gas temperature EGR cooler downstream; shut off threshold exceeded	524016	11	1258	HFM sensor; electrical fault
523980	14	1187	Bad quality of reduction agent detected	524021	11	1263	Burner fuel line pipe leak behind Shut Off Valve
523981	11	918	Urea-tank without heating function (heating phase)	524024	11	1302	Deviation of the exhaust gas temp. setpoint to actual value downstream (DOC) too high
523982	0	360	Powerstage diagnosis disabled; high battery voltage	524028	2	1431	CAN message PROEGRActr; plausibility error
523982	1	361	Powerstage diagnosis disabled; low battery voltage	524029	2	1432	Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner
523988	3	1245	Charging lamp; short circuit to battery	524030	7	1440	EGR actuator; internal error
523988	4	1246	Charging lamp; short circuit to ground	524031	13	1441	EGR actuator; calibration error
523988	5	1243	Charging lamp; open load	524032	2	1442	EGR actuator; status message "EGRCust" is missing
523988	12	1244	Charging lamp; over temp.	524033	7	1443	EGR actuator; due to overload in Save Mode
523998	4	1327	Injector cylinder bank 2 slave; short circuit	524034	3	1438	Disc separator; short circuit to battery
523999	12	1328	Injector powerstage output Slave defect	524034	4	1439	Disc separator; short circuit to ground
524014	1	1254	Air pressure glow plug flush line; below limit	524034	5	1436	Disc Separator; open load
				524034	12	1437	Disc Separator; powerstage over temperature

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

SPN	FMI	KWP	Description	SPN	FMI	KWP	Description
524035	12	1341	Injector diagnostics; time out error in the SPI communication	524108	9	1669	Timeout error of CAN-Transmit-Frame ComEGRTVActr
524057	2	1505	Electric fuel pump; fuel pressure build up error	524109	9	1679	Timeout error of CAN-Receive-Frame ComRxEGRTVActr
524097	9	1663	Timeout error of CAN-Transmit-Frame DPFBrnAirPmpCtl	524110	9	1670	Timeout error of CAN-Transmit-Frame ComETVActr
524098	9	1664	Timeout error of CAN-Transmit-Frame ComDPFBrnPT	524111	9	1680	Timeout error of CAN-Receive-Frame ComRxETVActr
524099	9	1665	Timeout error of CAN-Transmit-Frame ComDPFC1	524112	9	1671	Timeout ComITVActr
524100	9	1666	Timeout error of CAN-Transmit-Frame ComDPFHisDat	524113	9	1681	Timeout error of CAN-Receive-Frame ComRxITVActr
524101	9	1667	Timeout error of CAN-Transmit-Frame ComDPFTstMon	524114	9	1659	Timeout error of CAN-Transmit-Frame A1DOC
524102	9	1674	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmpCtl	524115	9	1660	Timeout error of CAN-Transmit-Frame AT1S
524103	9	1675	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmp	524116	9	1661	Timeout error of CAN-Transmit-Frame SCR2
524104	9	1676	Timeout error of CAN-Receive-Frame ComRxDPFCtl	524117	9	1662	Timeout error of CAN-Transmit-Frame SCR3
524105	9	1668	Timeout error of CAN-Transmit-Frame ComEGRMsFlw	524118	9	1672	Timeout error of CAN-Receive-Frame ComRxCM1
524106	9	1677	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw1	524119	9	1673	Timeout error of CAN-Receive-Frame ComRxCustSCR3
524107	9	1678	Timeout error of CAN-Receive-Frame ComRxEGRMsFlw2				

## Deutz D 2.9 L4 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier / KWP = Keyword Protocol**

<b>SPN</b>	<b>FMI</b>	<b>KWP</b>	<b>Description</b>
524120	9	1682	Timeout error of CAN-Receive-Frame ComRxSCRHtDiag
524121	9	1683	Timeout error of CAN-Receive-Frame ComRxTrbChActr
524122	9	1684	Timeout error of CAN-Receive-Frame ComRxUQSens
524123	9	1685	Timeout error of CAN-Receive-Frame ComSCRHtCtl
524124	9	1686	Timeout error of CAN-Receive-Frame ComTxAT1IMG
524125	9	1687	Timeout error of CAN-Receive-Frame ComTxTrbChActr

## Perkins 404F-22 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier**

SPN	FMI	Description	SPN	FMI	Description
29	3	Accelerator Pedal Position 2: Voltage Above Normal	172	3	Engine Air Inlet Temperature: Voltage Above Normal
29	4	Accelerator Pedal Position 2: Voltage Below Normal	172	4	Engine Air Inlet Temperature: Voltage Below Normal
91	3	Accelerator Pedal Position 1: Voltage Above Normal	190	0	Engine Speed : High- most severe (3)
91	4	Accelerator Pedal Position 1: Voltage Below Normal	190	8	Engine Speed : Abnormal Frequency, Pulse Width or Period
100	1	Engine Oil Pressure :Low- most severe (3)	558	3	Accelerator Pedal1 Low Idle Switch: Voltage Above Normal
108	3	Barometric Pressure : Voltage Above Normal	558	4	Accelerator Pedal1 Low Idle Switch: Voltage Below Normal
108	4	Barometric Pressure : Voltage Below Normal	638	6	Engine Fuel Rack Actuator: Current Above Normal
110	3	Engine Coolant Temperature : Voltage Above Normal	639	14	J1939 Network#1: Special Instruction
110	4	Engine Coolant Temperature : Voltage Below Normal	723	3	Engine Speed Sensor #2: Voltage Above Normal
110	15	Engine Coolant Temperature : High -least severe (1)	723	4	Engine Speed Sensor #2: Voltage Below Normal
168	0	Battery Potential/ Power Input 1 : High- most severe (3)	723	8	"Engine Speed Sensor#2: Abnormal Frequency, Pulse Width or "Period"
168	3	Battery Potential/ Power Input 1: Voltage Above Normal	723	10	Engine Speed Sensor #2: Abnormal Rate of Change
168	4	Battery Potential/ Power Input 1: Voltage Below Normal	733	3	Engine Rack Position Sensor: Voltage Above Normal
			733	4	Engine Rack Position Sensor: Voltage Below Normal



## Perkins 404F-22 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier**

<b>SPN</b>	<b>FMI</b>	<b>Description</b>	<b>SPN</b>	<b>FMI</b>	<b>Description</b>
1485	7	ECU Main Relay : Not Responding Property	3242	15	"Particulate Trap Intake Gas Temp: High - least severe"(1)"
2840	11	ECU Instance: Other Failure Mode	3242	16	Particulate Trap Intake Gas Temp: High-moderate severity (2)
2840	12	ECU Instance: Failure	3251	3	Particulate Trap Differential Pressure :Voltage Above Normal
2840	13	ECU Instance: Out of Calibration	3251	4	Particulate Trap Differential Pressure :Voltage Below Normal
2970	3	Accelerator Pedal 2 Low Idle Switch: Voltage Above Normal	3473	7	Aftertreatment #1 Failed to Ignite: Not Responding Properly
2970	4	Accelerator Pedal 2 Low Idle Switch: Voltage Below Normal	3473	11	Aftertreatment #1 Failed to Ignite : Other Failure Mode
3241	1	Exhaust Gas Temperature 1: Low- most severe (3)	3484	0	Aftertreatment #1 Ignition : High-most severe (3)
3241	3	Exhaust Gas Temperature 1: Voltage Above Normal	3484	3	Aftertreatment #1 Ignition : Voltage Above Normal
3241	4	Exhaust Gas Temperature 1: Voltage Below Normal	3484	4	Aftertreatment #1 Ignition : Voltage Below Normal
3241	15	Exhaust Gas Temperature 1: High- least severe (1)	3556	6	Aftertreatment 1 Hydrocarbon Doser 1: Current Above Normal
3241	16	Exhaust Gas Temperature 1: High- moderate severity (2)	3610	3	"Diesel Particulate Filter Outlet Pressure Sensor 1: Voltage "Above Normal"
3242	1	"Particulate Trap Intake Gas Temp: Low- most severe"(3)"	3610	4	DieselParticulate Filter Outlet Pressure Sensor 1: Voltage Below Normal
3242	3	"Particulate Trap Intake Gas Temp: Voltage Above "Normal"			
3242	4	"Particulate Trap Intake Gas Temp: Voltage Below "Normal"			

## Perkins 404F-22 Engine Fault Codes

**SPN = Suspect Parameter Number / FMI - Failure Mode Identifier**

<b>SPN</b>	<b>FMI</b>	<b>Description</b>	<b>SPN</b>	<b>FMI</b>	<b>Description</b>
3713	7	DPF Active Regeneration Inhibited Due to System Timeout: Not Responding Properly	4765	4	Aftertreatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Below Normal
3713	31	DPF Active Regeneration Inhibited Due to System Timeout	4765	15	Aftertreatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: High-least severe (1)
3719	0	Particulate Trap #1 Soot Load Percent: High- most severe (3)	4765	16	Aftertreatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: High-moderate severity (2)
3719	16	Particulate Trap #1 Soot Load Percent: High-moderate severity (2)	5487	3	Aftertreatment 1 Burner Unit Combustion Chamber Temperature: Voltage Above Normal
4016	6	High Current Auxiliary Power Relay 1: Current Above Normal	5487	4	Aftertreatment 1 Burner Unit Combustion Chamber Temperature: Voltage Below Normal
4201	3	Engine Speed Sensor #1: Voltage Above Normal	6581	6	Aftertreatment 1 Hydrocarbon Doser 2 : Current Above Normal
4201	4	Engine Speed Sensor #1: Voltage Below Normal			
4201	8	"Engine Speed Sensor #1: Abnormal Frequency, Pulse Width, or "Period"			
4201	10	Engine Speed Sensor #1: Abnormal Rate of Change			
4765	1	Aftertreatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: Low-most severe (3)			
4765	3	Aftertreatment #1 Diesel Oxidation Catalyst Intake Gas Temperature: Voltage Above Normal			

## Ford MSG-425 Engine Fault Codes

### Ford MSG-425 Engine Fault Codes

#### How to Retrieve Ford Engine Fault Codes

The ECM constantly monitors the engine by the use of sensors on the engine. The ECM also uses signals from the sensors to initiate sequential fuel injection and make constant and instantaneous changes to ignition timing, fuel delivery and throttle position to maintain the engine's running condition at its highest efficiency while at the same time keeping exhaust emissions to a minimum. When a sensor fails or returns signals that are outside of set parameters, the ECM will store a fault code in memory that relates to the appropriate sensor and will turn on the Check Engine Light.

Note: Perform this procedure with the key switch in the off position.

- 1 Locate the run/test toggle switch on the side of the ground control box.
- 2 Pull out the red Emergency Stop button to the on position at both the ground and platform controls.
- 3 Quickly activate and release the start toggle switch/button. Do not start the engine.
- 4 Move and hold the run/test toggle switch to the test position.
- ⦿ Result: The check engine light should turn on. The check engine light should begin to blink.

- 5 Continue to hold the run/test toggle switch in the test position and count the blinks.

Note: Before the fault codes are displayed, the check engine light will blink a code 1-6-5-4 three times. After the fault codes, the check engine light will blink a code 1-6-5-4 three times again indicating the end of the stored codes.

Note: If any fault codes are present, the ECM will blink a three digit code three times for each code stored in memory. It will blink the first digit of a three digit code, pause, blink the second digit, pause, and then blink the third digit. For example: the check engine light blinks 5 consecutive times, blinks 3 times and then 1 time. That would indicate code 531.

Note: Once a fault code has been retrieved and the repair has been completed, the ECM memory must be reset to clear the fault code from the ECM. See *How to Clear Engine Fault Codes from the ECM*.

#### How to Clear Engine Fault Codes from the ECM

Note: Perform this procedure with the engine off and the key switch in the off position.

- 1 Open the engine side turntable cover and locate the battery.
- 2 Disconnect the negative battery cable from the battery for a minimum of 5 minutes.

#### **⚠ WARNING**

Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

- 3 Connect the negative battery cable to the battery.



## Ford MSG-425 Engine Fault Codes

Code	Description
16	Never crank synced at start
91	FP low voltage
92	FP high voltage
107	MAP Low Voltage
108	MAP High Pressure
111	IAT higher than expected 1
112	IAT low voltage
113	IAT high voltage
116	ECT higher than expected 1
117	ECT/CHT Low Voltage
118	ECT/CHT High Voltage
121	TPS1 lower than TPS2
122	TPS1 low voltage
123	TPS1 high voltage
127	IAT higher than expected 2
129	BP low pressure
134	EGO open/lazy pre-cat 1
140	EGO open/lazy post-cat 1
154	EGO open/lazy pre-cat 2/post-cat 1
160	EGO open/lazy post-cat 2
171	AL high gasoline bank1
172	AL low gasoline bank1

Code	Description
174	AL high gasoline bank2
175	AL low gasoline bank2
182	FT Gasoline Low Voltage
183	FT Gasoline High Voltage
187	FT Gaseous fuel low voltage
188	FT Gaseous fuel high voltage
217	ECT higher than expected 2
219	Max govern speed override
221	TPS1 higher than TPS2
222	TPS2 low voltage
223	TPS2 high voltage
236	TIP Active
237	TIP Low Voltage
238	TIP High Voltage
261	Injector Loop Open or Low-side short to Ground
262	Injector Coil Shorted
264	Injector Loop Open or Low-side short to Ground
265	Injector Coil Shorted
267	Injector Loop Open or Low-side short to Ground

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067



## Ford MSG-425 Engine Fault Codes

Code	Description
268	Injector Coil Shorted
270	Injector Loop Open or Low-side short to Ground
271	Injector Coil Shorted
273	Injector Loop Open or Low-side short to Ground
274	Injector Coil Shorted
276	Injector Loop Open or Low-side short to Ground
277	Injector Coil Shorted
279	Injector Loop Open or Low-side short to Ground
280	Injector Coil Shorted
282	Injector Loop Open or Low-side short to Ground
283	Injector Coil Shorted
285	Injector Loop Open or Low-side short to Ground
286	Injector Coil Shorted
288	Injector Loop Open or Low-side short to Ground
289	Injector Coil Shorted

Code	Description
301	Emissions/catalyst damaging misfire
302	Emissions/catalyst damaging misfire
303	Emissions/catalyst damaging misfire
304	Emissions/catalyst damaging misfire
305	Emissions/catalyst damaging misfire
306	Emissions/catalyst damaging misfire
307	Emissions/catalyst damaging misfire
308	Emissions/catalyst damaging misfire
326	Knock 1 Excessive Signal
327	Knock 1 sensor Open
331	Knock 2 Excessive Signal
332	Knock 2 sensor Open
336	Crank sync noise
337	Crank loss
341	Cam sync noise
342	Cam loss
420	Gasoline cat monitor
430	Gasoline cat monitor
524	Oil pressure low
562	Battery Voltage Low
563	Battery Voltage High

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067



## Ford MSG-425 Engine Fault Codes

Code	Description
601	Flash checksum invalid
604	RAM failure
606	COP failure
615	Start relay coil open
616	Start relay control ground short
617	Start relay coil short to power
627	Fpump relay coil open
628	FPump motor loop open or high-side shorted to ground
628	Fpump relay control ground short
629	FPump motor high-side shorted to power
629	Fpump relay coil short to power
642	5VE1 low voltage
643	5VE1 high voltage
650	MIL open
652	5VE2 low voltage
653	5VE2 high voltage
685	Relay Coil Open
686	Relay Control ground short
687	Relay coil short to power
1111	Fuel rev limit
1112	Spark rev limit
1121	FPP1/2 simultaneous voltages out of range

Code	Description
1122	FPP1/2 do not match each other or the IVS
1151	CL high LPG
1152	CL low LPG
1153	CL high NG
1154	CL low NG
1155	CL high gasoline bank1
1156	CL low gasoline bank1
1157	CL high gasoline bank2
1158	CL low gasoline bank2
1161	AL high LPG
1162	AL low LPG
1163	AL high NG
1164	AL low NG
1165	LPG cat monitor
1166	NG cat monitor
1171	Megajector delivery pressure higher than expected
1172	Megajector delivery pressure lower than expected
1173	Megajector comm lost
1174	Megajector voltage supply high
1175	Megajector voltage supply low
1176	Megajector internal actuator fault detection

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067



## Ford MSG-425 Engine Fault Codes

Code	Description
1177	Megajector internal circuitry fault detection
1178	Megajector internal comm fault detection
1311	Misfire detected
1312	Misfire detected
1313	Misfire detected
1314	Misfire detected
1315	Misfire detected
1316	Misfire detected
1317	Misfire detected
1318	Misfire detected
1511	AUX analog PU1 high
1512	AUX analog PU1 low
1513	AUX analog PU2 high
1514	AUX analog PU2 low
1515	AUX analog PD1 high
1516	AUX analog PD1 low
1517	AUX analog PU3 high
1518	AUX analog PU3 low
1521	CHT higher than expected 1
1522	CHT higher than expected 2
1531	IVS/Brake/Trans-Park interlock failure

Code	Description
1541	AUX analog PUD1 high
1542	AUX analog PUD1 low
1543	AUX analog PUD2 high
1544	AUX analog PUD2 low
1545	AUX analog PUD3 high
1551	AUX DIG1 high
1552	AUX DIG1 low
1553	AUX DIG2 high
1554	AUX DIG2 low
1555	AUX DIG3 high
1556	AUX DIG3 low
1561	AUX analog PD2 high
1562	AUX analog PD2 low
1563	AUX analog PD3 high
1564	AUX analog PD3 low
1611	5VE 1/2 simultaneous out of range
1612	RTI 1 loss
1613	RTI 2 loss
1614	RTI 3 loss
1615	A/D loss
1616	Invalid interrupt
1621	Rx Inactive
1622	Rx Noise

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067



## Ford MSG-425 Engine Fault Codes

Code	Description
1623	Invalid Packet Format
1624	Shutdown Request
1625	Shutdown Request
1626	CAN Tx failure
1627	CAN Rx failure
1628	CAN addresss conflict failure
1629	J1939 TSC1 message receipt lost
1630	J1939 ETC message receipt lost
1631	PWM1-Gauge1 open / ground short
1632	PWM1-Gauge1 short to power
1633	PWM2-Gauge2 open / ground short
1634	PWM2-Gauge2 short to power
1635	PWM3-Gauge3 open / ground short
1636	PWM3-Gauge3 short to power
1641	Buzzer control ground short
1642	Buzzer open
1643	Buzzer control short to power
1644	MIL control ground short
1645	MIL control short to power
2111	Unable to reach lower TPS
2112	Unable to reach higher TPS
2115	FPP1 higher than IVS limit
2116	FPP2 higher than IVS limit

Code	Description
2120	FPP1 invalid voltage and FPP2 disagrees with IVS
2121	FPP1 lower than FPP2
2122	FPP1 high voltage
2123	FPP1 low voltage
2125	FPP2 invalid voltage and FPP1 disagrees with IVS
2126	FPP1 higher than FPP2
2127	FPP2 low voltage
2128	FPP2 high voltage
2130	IVS stuck at-idle, FPP1/2 match
2131	IVS stuck off-idle, FPP1/2 match
2135	TPS1/2 simultaneous voltages out of range
2139	FPP1 lower than IVS limit
2140	FPP2 lower than IVS limit
2229	BP high pressure
2300	Primary Loop Open or Low-side Short to Ground
2301	Primary Coil Shorted
2303	Primary Loop Open or Low-side Short to Ground
2304	Primary Coil Shorted
2306	Primary Loop Open or Low-side Short to Ground
2307	Primary Coil Shorted

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067



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Ford MSG-425 Engine Fault Codes

Code	Description
2309	Primary Loop Open or Low-side Short to Ground
2310	Primary Coil Shorted
2312	Primary Loop Open or Low-side Short to Ground
2313	Primary Coil Shorted
2315	Primary Loop Open or Low-side Short to Ground
2316	Primary Coil Shorted
2318	Primary Loop Open or Low-side Short to Ground
2319	Primary Coil Shorted
2321	Primary Loop Open or Low-side Short to Ground
2322	Primary Coil Shorted
2618	Tach output ground short
2619	Tach output short to power

For further engine fault code troubleshooting and diagnostic information, refer to the *Ford MSG-425/ Ford DSG-423 EFI Diagnostic Manual* (EDI part number 1080030).

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**Ford MSG-425/DSG-423 EFI Diagnostic Manual**  
Genie part number 162067

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# Schematics



## Observe and Obey:

- ☑ Troubleshooting and repair procedures shall be completed by a person trained and qualified on the repair of this machine.
- ☑ Immediately tag and remove from service a damaged or malfunctioning machine.
- ☑ Repair any machine damage or malfunction before operating the machine.

## Before Troubleshooting:

- ☑ Read, understand and obey the safety rules and operating instructions in the appropriate Operator's Manual on your machine.
- ☑ Be sure that all necessary tools and test equipment are available and ready for use.

## About This Section

There are two groups of schematics in this section.

### Electrical Schematics

#### **⚠ WARNING**

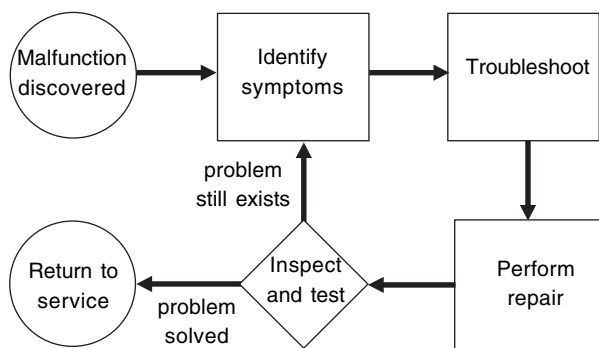
Electrocution/burn hazard. Contact with electrically charged circuits could result in death or serious injury. Remove all rings, watches and other jewelry.

### Hydraulic Schematics

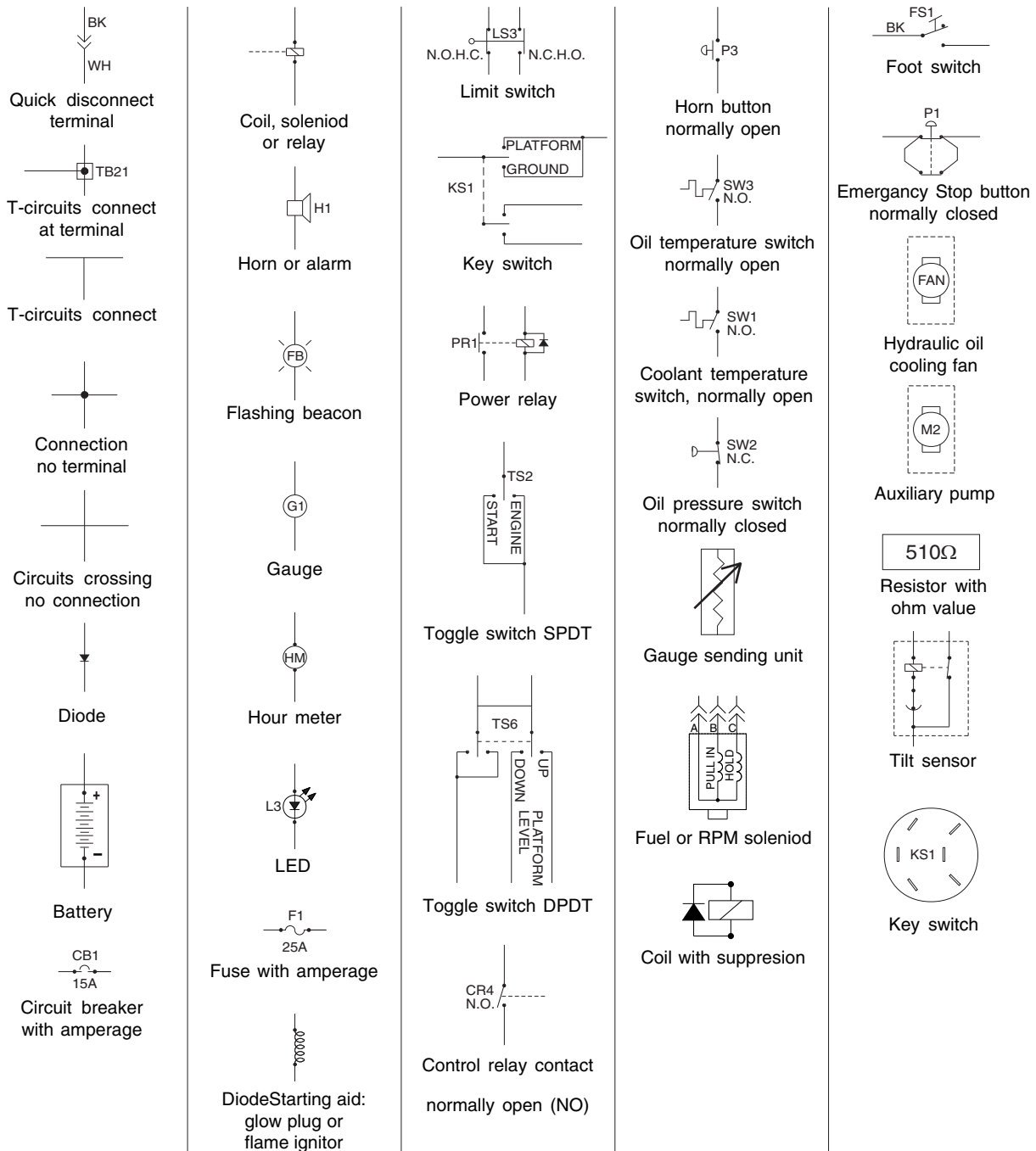
#### **⚠ WARNING**

Bodily injury hazard. Spraying hydraulic oil can penetrate and burn skin. Loosen hydraulic connections very slowly to allow the oil pressure to dissipate gradually. Do not allow oil to squirt or spray.

### General Repair Process

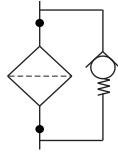


## Electrical Symbols Legend





## Hydraulic Symbols Legend



Filter with bypass relief valve



Pump, fixed displacement



Pump, bi-directional variable displacement



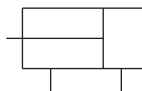
Motor, bi-directional



Motor 2 speed bi-directional



Pump, prime mover (engine or motor)



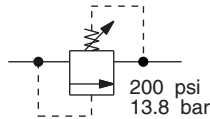
Double acting cylinder



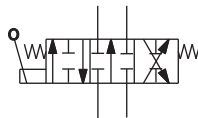
Orifice with size



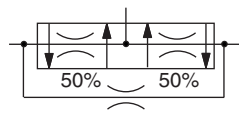
Check valve



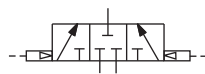
Relief valve with pressure setting



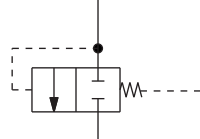
Directional valve (mechanically activated)



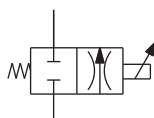
Flow divider/combiner valve



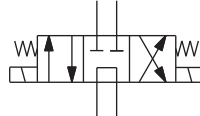
Pilot operated 3 position, 3 way, shuttle valve



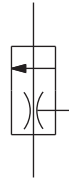
Differential sensing valve



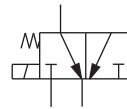
Solenoid operated proportional valve



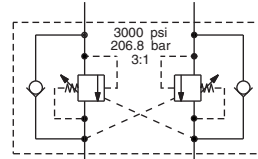
Solenoid operated 3 position, 4 way, directional valve



Priority flow regulator valve



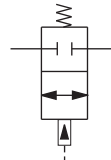
Solenoid operated 2 position, 3 way, directional valve



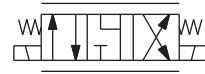
Counterbalance valve with pressure and pilot ratio



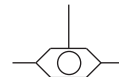
2 position, 2 way, solenoid valve



Pilot operated 2 position, 2 way, directional valve



Solenoid operated 3 position, 4 way, proportional directional valve



2 position, 3 way, shuttle valve



Brake



Shut off valve

## Electrical Abbreviations Legend

Item	Description
<b>B</b>	<b>Battery</b>
B1	Engine Start - 12V DC
<b>C</b>	<b>Connector</b>
C7	Power to platform, 12v cable connector
C9	Footswitch input connector
C54	Options connector
<b>CB</b>	<b>Circuit Breaker</b>
CB1	Circuit breaker, engine, 15a
CB2	Circuit breaker, controls, 15a
CB7	Circuit breaker, controls, 10a Engine throttle solenoid
<b>CR</b>	<b>Control Relay</b>
CR1	Start relay
CR2	Ignition power relay
CR4	High idle relay
CR5	Horn relay
CR13	Jib relay (jib option)
CR14	Jib relay (jib option)
CR17	Hydraulic oil cooling fan (option)
CR23	Drive light enable
CR27	Brake circuit relay (lift/drive option)
CR30	Limit switch relay (lift/drive option)
CR76	Load sense aux recovery (AS models)
CR51	Aircraft package (option)
<b>G</b>	<b>Gauge</b>
G1	Battery Charge Indicator
G2	Engine oil pressure
G3	Engine coolant temp.
G4	Engine oil temp.
G6	Hourmeter

Item	Description
<b>H</b>	<b>Horn or Alarm</b>
H1	Tilt/load sense alarm
H4	Descent (ground)
H6	Load sense (ground)
<b>JC</b>	<b>Joystick</b>
JC1	Boom proportional joystick: secondary boom up/down
JC2	Boom proportional joystick: primary up/down, turntable rotate
JC3	Drive proportional joystick
<b>KS</b>	<b>Keyswitch</b>
KS1	Key switch
<b>L</b>	<b>LED or Light</b>
L1	Drive enable led
L2	Check engine led
L4	Platform overload led (ce only)
L29	Drive lights
L48	Tilt alarm led (ansi/csa only)
<b>LS</b>	<b>Limit Switch</b>
LS1	Primary boom extend
LS2	Primary boom up
LS3	Drive enable
LS4	Secondary boom up
LS18	CE limit switch

## Electrical Abbreviations Legend

Item	Description
M	Motor
M2	Auxiliary pump
M3	Engine starter
M4	Fuel pump
P	Button
P1	Red emergency stop button
P2	Emergency stop button
P3	Horn Button
P4	Function enable button
PR	Power Relay
PR1	Auxiliary pump (m2)
PR2	Engine starter (m3)
PR3	Starting aid / glow plugs
PR4	Function pump (m5)
R	Resistor
R4	Speed limiting variable resistor 20 ohms
R14	Up/down speed resistor 7.5 ohms
SW	Switch
SW2	Engine oil pressure
SW3	Engine oil temperature

Item	Description
TS	Toggle Switch
TS1	Auxiliary pump switch
TS2	Start engine switch
TS3	Fuel select switch (ford efi only)
TS4	Hi/low rpm switch
TS6	Glow plug switch
TS7	Platform rotate switch
TS8	Jib rotate switch (jib option)
TS9	Platform level switch
TS13	Primary boom extend/retract switch
TS14	Drive speed switch
TS15	Drive enable switch
TS43	Heater switch (option)
TS46	Proximity kill switch (option)
TS47	Generator switch (option)
TS51	Auxiliary pump toggle switch
TS52	Engine start toggle switch
TS53	Fuel select toggle switch
TS54	Rpm select toggle switch
TS56	Glow plug toggle switch
TS57	Platform rotate toggle switch
TS58	Jib boom up/down toggle switch (option)
TS59	Platform level up/down toggle switch
TS60	Secondary boom up/down toggle switch
TS61	Primary boom up/down toggle switch
TS62	Turntable rotate toggle switch
TS63	Primary boom extend/retract toggle switch
TS64	Run/test toggle switch (Ford)
TS74	Run/test toggle switch (Deutz)

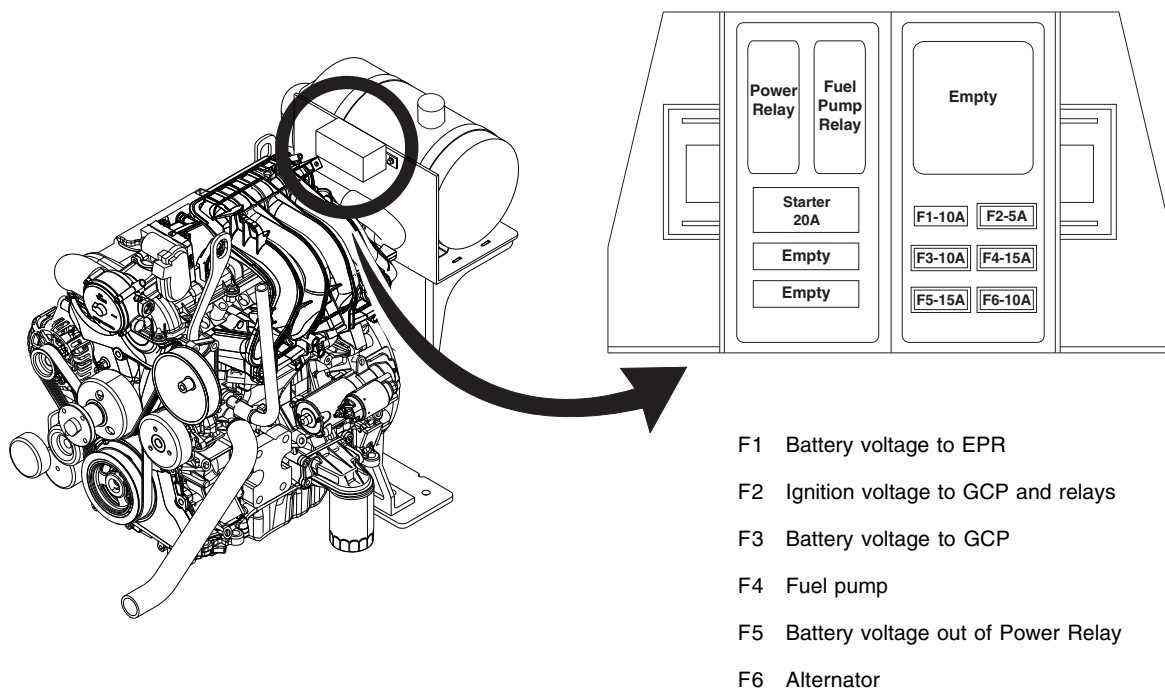
## Electrical Abbreviations Legend

Item	Description
U	Module
U1	Ignition start module
U4	EDC - drive pump
U13	Alc 500 joystick controller card
U18	Control module
U33	Load sense module
U34	Time delay relay - 2 seconds, 10A
U35	Time delay relay
U38	Time delay relay
U39	J1939 Ground Control Box Display
X	ALC500 connectors
X101	ALC500 power connector
X101	ALC500 input/out connectors
X102	ALC500 input/out connectors
X103	ALC500 input/out connectors
X104	ALC500 input/out connectors
X105	ALC500 input/out connectors
X106	ALC500 input/out connectors
X107	ALC500 input/out connectors
X108	ALC500 input/out connectors
X109	ALC500 input/out connectors
X1-4	Circuit splice

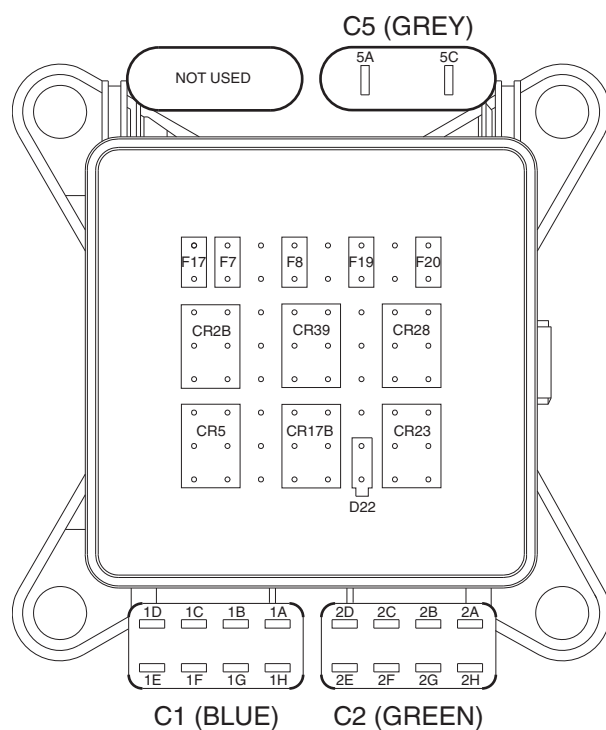
Wire Color Legend	
Item	Description
BL	Blue
BK	Black
BR	Brown
GN	Green
OR	Orange
PP	Purple
RD	Red
WH	White
YL	Yellow
BL/RD	Blue/Red
BL/WH	Blue/White
BK/RD	Black/Red
OR/WH	Orange/White
RD/BK	Red/Black
RD/WH	Red/White
WH/BL	White/Blue
WH/BK	White/Black
WH/RD	White/Red
WH/YL	White/Yellow
YL/BK	Yellow/Black

## Ford Engine Relay Layout

### Ford MSG-425 EFI



## Engine Relay Layout - Deutz D 2.9 L4 and Perkins 404F-22



### Deutz D 2.9 L4

#### Fuses

F7	20A, Horn, Hydraulic oil cooler
F8	30A, ECU power
F17	15A, Ignition
F19	10A, Engine accessory
F20	20A, Fuel pump

#### Relays

CR2B	Ignition on
CR5	Horn
CR28	Fuel pump
CR17B	Hydraulic oil cooler (option)
CR23	Engine accessory
CR39	Auxiliary pump

#### Diode

D22	6A, Alternator Ext.
-----	---------------------

### Perkins 404F-22

#### Fuses

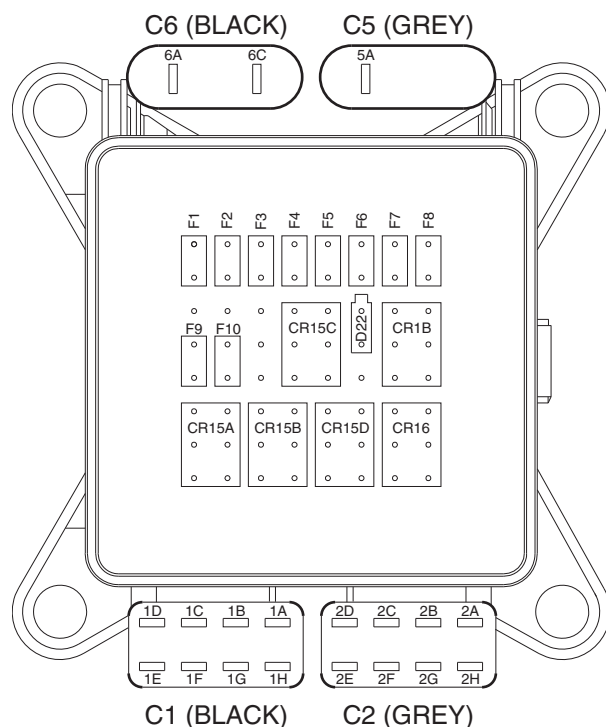
F1	15A, ARD Injector 1
F2	15A, ARD Injector 2
F3	15A, Relay power
F4	5A, Linear solenoid
F5	15A, ARD Glow plug
F6	7.5A, Engine start
F7	7.5A, BAP
F8	10A, Fuel pump, Alternator Ext.
F9	20A, Glow plug 1
F10	20A, Glow plug 2

#### Relays

CR1B	Engine start
CR16	Fuel pump, Alternator Ext.
CR15A	Glow plug 1
CR15B	Glow plug 2
CR15C	ARD Glow plug
CR15D	Burner air pump

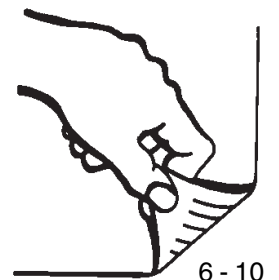
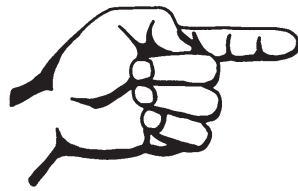
#### Diode

D22	6A, Alternator Ext.
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## Connector Pin Legend



Connector Pin Legend

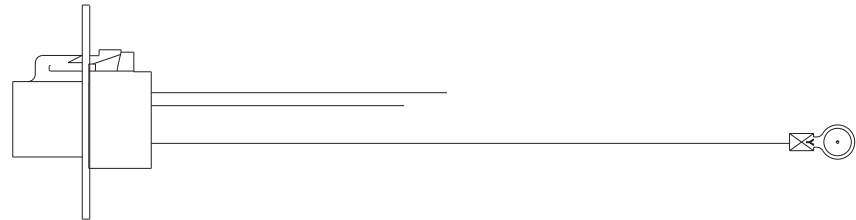
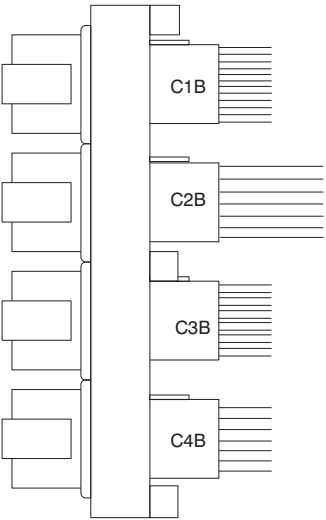
1 A B C D E F G H I J K L M N

GROUND CONTROL BOX

2 GRAY/BLACK/GREEN/BROWN

PIN#	CKT#	COLOR
C1P-1	C27AUX	RD
C1P-2	C28TTA	RD/BK
C1P-3	C29MS	RD/WH
C1P-4	C30EDC+	WH
C1P-5	C31EDC-	WH/BK
C1P-6	C32BRK	WH/RD
C1P-7	C33STR	BK
C1P-8	C34WTS	BK/WH
C1P-9	C35RPM	BK/RD
C1P-10	C36STC	BL
C1P-11	C37STCC	BL/BK
C1P-12	C132PLI	BL/WH
C2P-1	C128RPM	OR/RD
C2P-2	C40LS1	OR
C2P-3	C41RPM	OR/BK
C2P-4	P134PWR	OR/RD
C2P-5	C46HRN	WH
C2P-6	JDALARM	GR/BK
C2P-7	C45GEN	GR/WH
C3P-1	C1PBU	RD
C3P-2	C2PBD	RD/BK
C3P-3	C3PBF	RD/WH
C3P-4	C4TRL	WH
C3P-5	C5TRR	WH/BK
C3P-6	C6TRF	WH/RD
C3P-7	C7PBE	BK
C3P-8	C8PBR	BK/WH
C3P-9	EDC_RET	BR
C4P-1	C13DRE	BL/RD
C4P-2	C14PLU	OR
C4P-3	C15PLD	OR/BK
C4P-4	C133PLA	GR/BK
C4P-5	C17JU	GR
C4P-6	C18JD	GR/BK
C4P-7	C19JSV	GR/WH
C4P-9	GND	BR
C4P-10	DRV_LT	RD
C4P-11	GND	BR
C4P-12	DRV_LT	RD

PIN#	CKT#	COLOR
C7-1	P22BAT	BK
C7-2	P23BAT	WH
C7-3	BATGND	BRN
C7-4	NC	NC

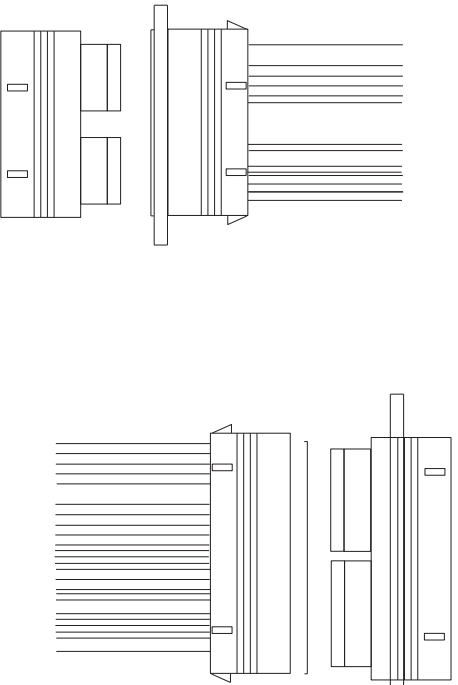
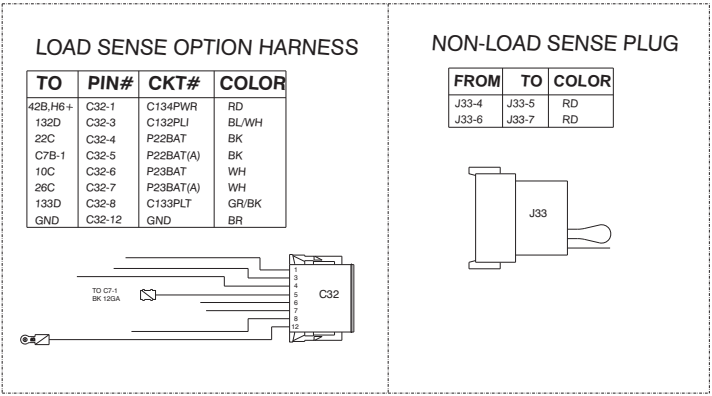


3 C5 ENGINE HARNESS  
Deutz D 2.9

PIN#	CKT#	COLOR	TERMINATOR
1	C41RPM	OR/BK	NONE
2	C116HYD	WH	BOM #2
3	C45GEN	GR/WH	NONE
4	C33STR	BK	NONE
5	DRV_LT	RD	BOM #40
6	EDC_RET	BR	NONE
7	C27AUX	RD/WH	BOM #18
8	C46HRN	WH	NONE
9	R46HRN	WH	BOM #2
10	C21IGN	WH	NONE
11	P110RET	WH	BOM #18
12			
13			
14			
15	D81CAN-	GR	
16	D82CAN+	YL	
17	R116HYD	OR	BOM #2
18			
19	P23PWR	WH	BOM #18
20	C31REV	WH/BK	NONE
21	C30FWD	WH	NONE
22	C34WTS	BK/WH	NONE
23	C32BRK	WH/RD	NONE
24	C29MS	RD/WH	NONE

4 C5 ENGINE HARNESS  
Perkins 404F

PIN#	CKT#	COLOR	TERMINATOR
1	C41RPM	OR/BK	NONE
2			
3	C45GEN	GR/WH	NONE
4	C33STR	BK	NONE
5			
6			
7	EDC_RET	BR	NONE
8	C27AUX	RD/WH	BOM #18
9	C46HRN	WH	NONE
10			BOM #2
11			
12			
13	C128RPM	OR/RD	
14	C35RPM	BK/RD	
15	D81CAN-	GR	
16	D82CAN+	YL	
17			
18			
19	P23PWR	WH	BOM #18
20	C31REV	WH/BK	NONE
21	C30FWD	WH	NONE
22	C34WTS	BK/WH	NONE
23	C32BRK	WH/RD	NONE
24	C29MS	RD/WH	NONE

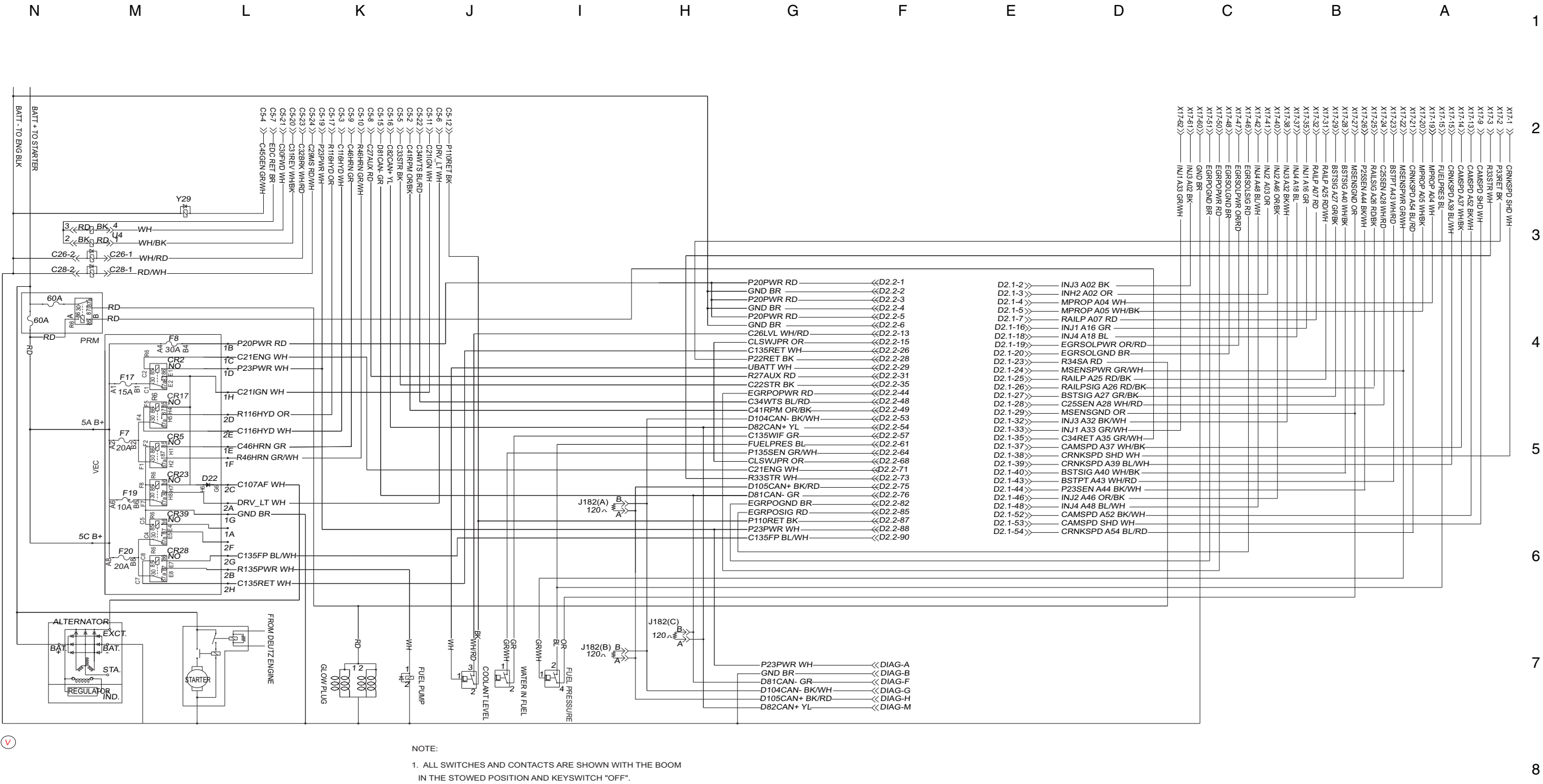


5 C6 FUNCTION HARNESS

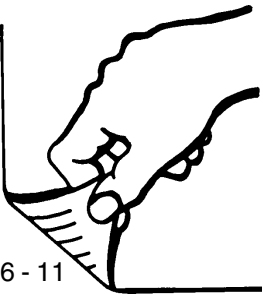
	CIRCUIT #	COLOR	TERMINATOR
1	C1PBU	RD	NONE
2	C2PBD	RD/BK	NONE
3	C3PBF	RD/WH	NONE
4	C4TRL	WH	NONE
5	C5TRR	WH/BK	NONE
6	C6TRF	WH/RD	NONE
7	C7PBE	BK	NONE
8	C8PBR	BK/WH	NONE
9			
10			
11			
12			
13	C13DRE	BL/RD	NONE
14	C14PLU	OR	NONE
15	C15PLD	OR/BK	NONE
16	R46HRN	WH	
17	C17JU	GR	NONE
18	C18JD	GR/BK	NONE
19	C129DA	RD/BK	NONE
20			
21			
22			
23	P134PWR	RD	NONE
24			
25	C116HYD	WH	
26	GND	BR	BOM #37
27	C27AUX	RD	NONE
28	C28TTA	RD/BK	NONE
29			
30	P22PWR	BK	NONE
31			
32	C130TA	WH/RD	NONE
33	R116HYD	OR	NONE
34	C21IGN	WH	NONE
35			
36	C36STC	BL	NONE
37	C37STCC	BL/BK	NONE
38			
39			
40	C40LS1	OR	NONE



Engine Wire Harness  
Deutz D 2.9 L4 Models

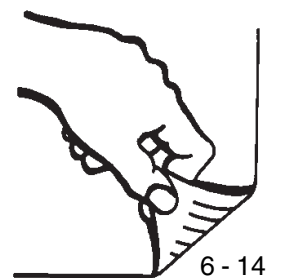
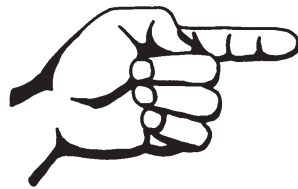


**Engine Wire Harness**  
Deutz D 2.9 L4 Models



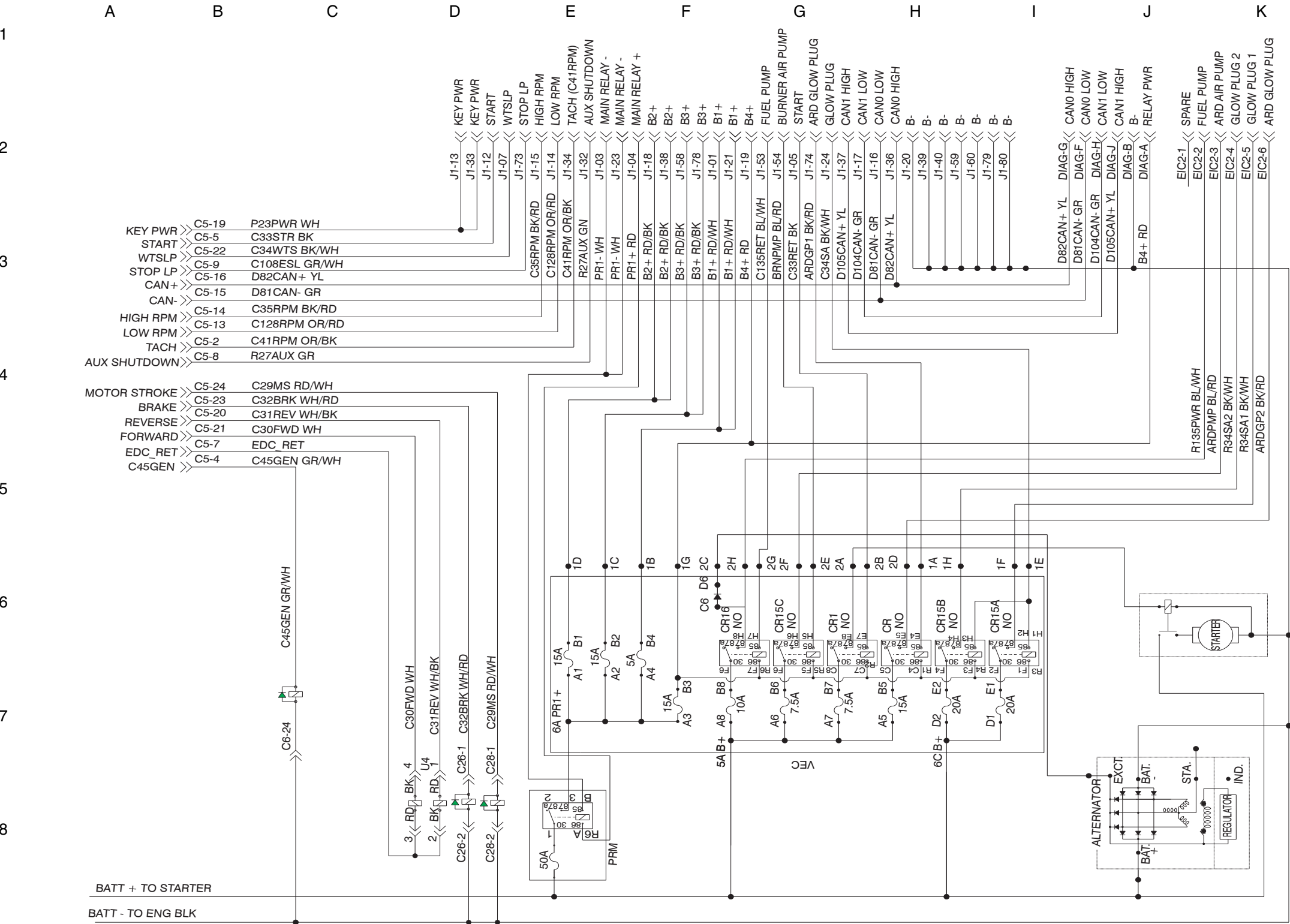
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**Engine Wire Harness**  
Perkins 404F Models

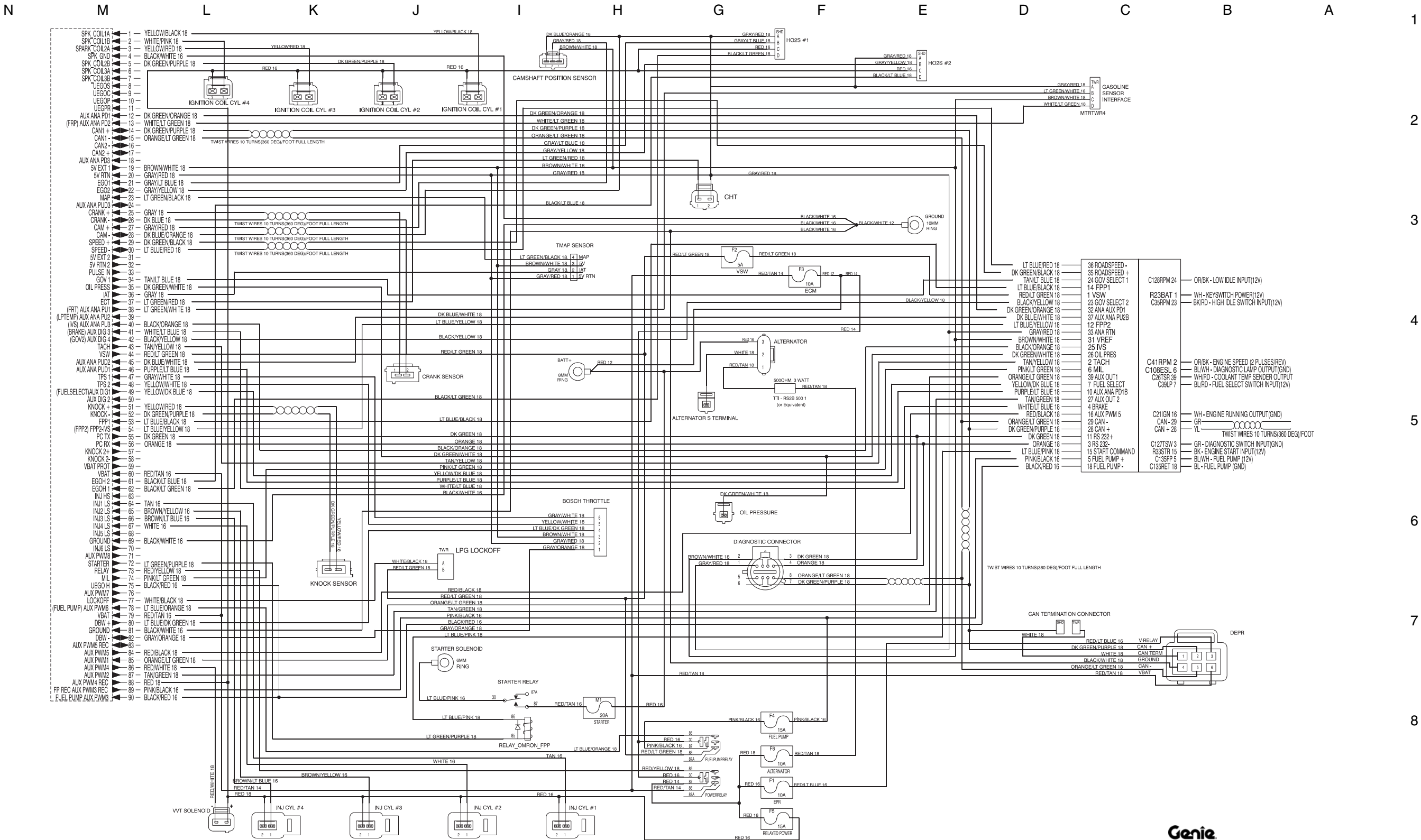


Engine Wire Harness

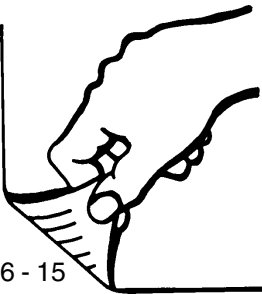
Perkins 404F Models



Engine Wire Harness  
Ford MSG-425 EFI Models

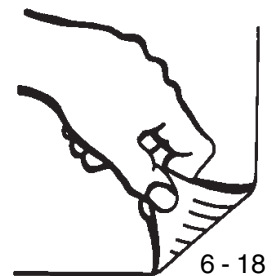
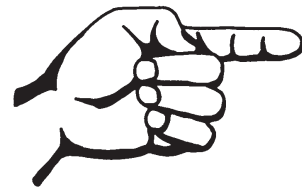


**Engine Wire Harness**  
Ford MSG-425 EFI Models



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**Electrical Schematic - ANSI**  
Deutz D 2.9 L4 Models

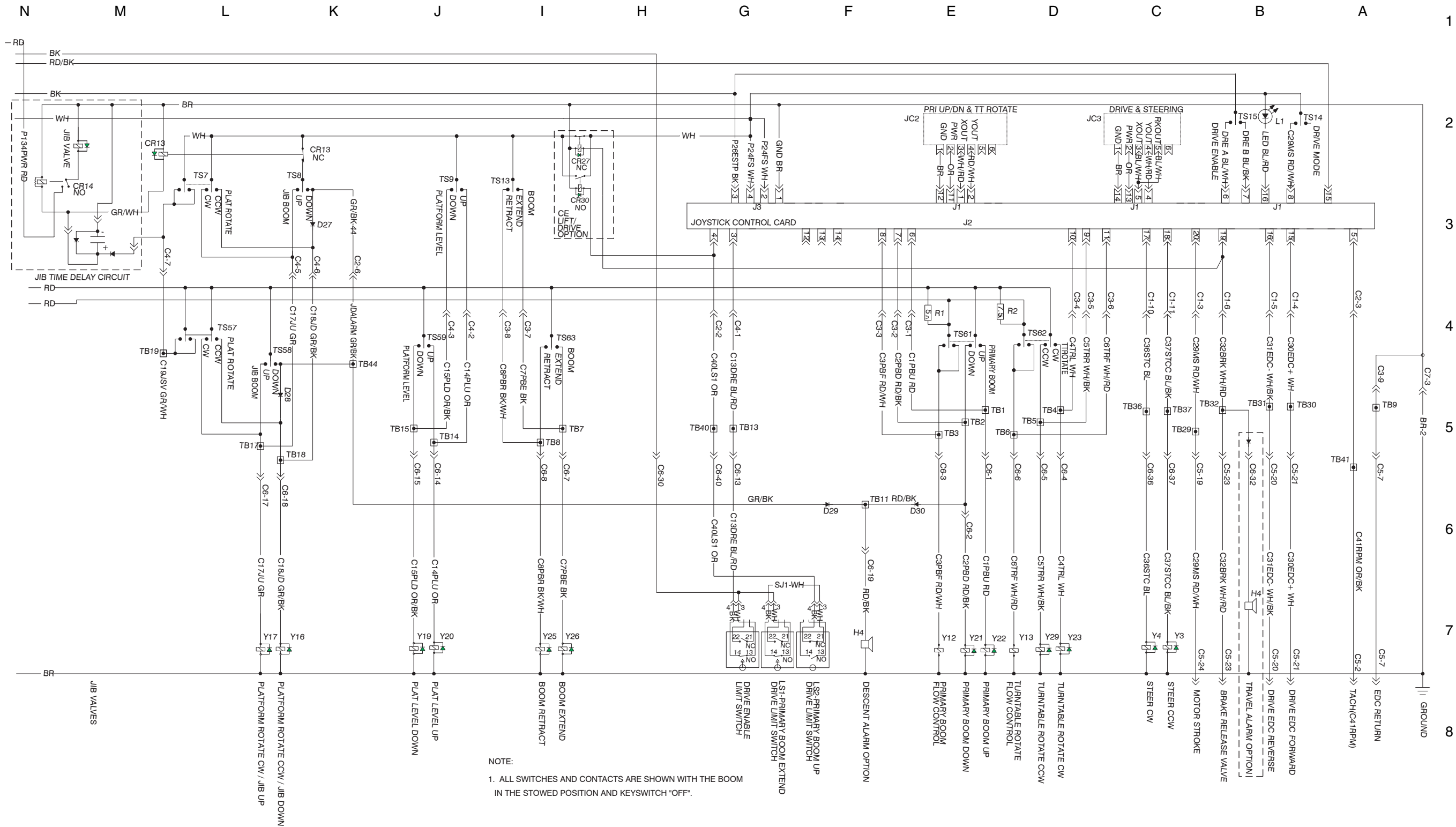


## Deutz D 2.9 L4 Models

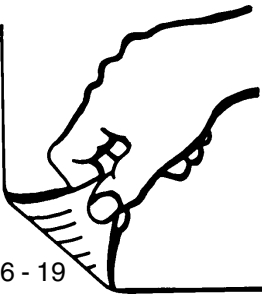




Electrical Schematic - ANSI  
Deutz D 2.9 L4 Models

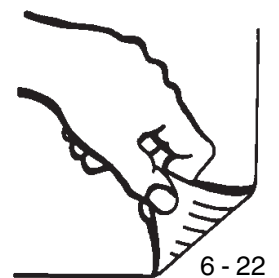
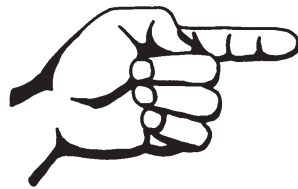


**Electrical Schematic - ANSI**  
Deutz D 2.9 L4 Models



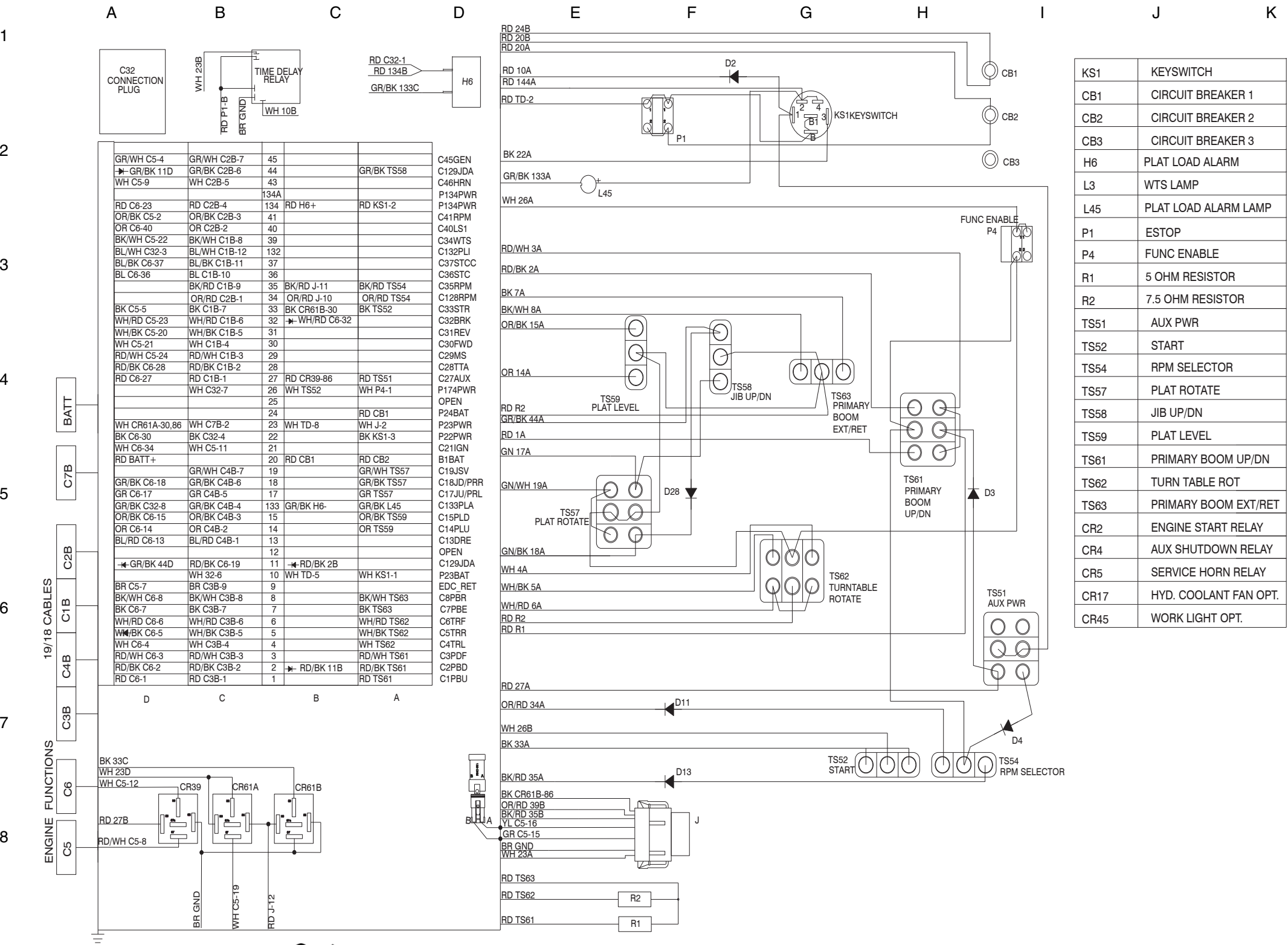
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**Ground Control Box Wiring Diagram - ANSI**  
Deutz D 2.9 L4 Models



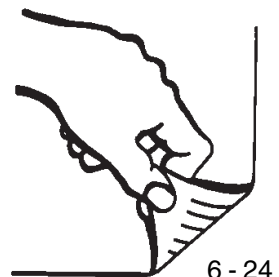
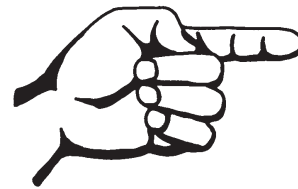
Ground Control Box Wiring Diagram - ANSI

Deutz D 2.9 L4 Models

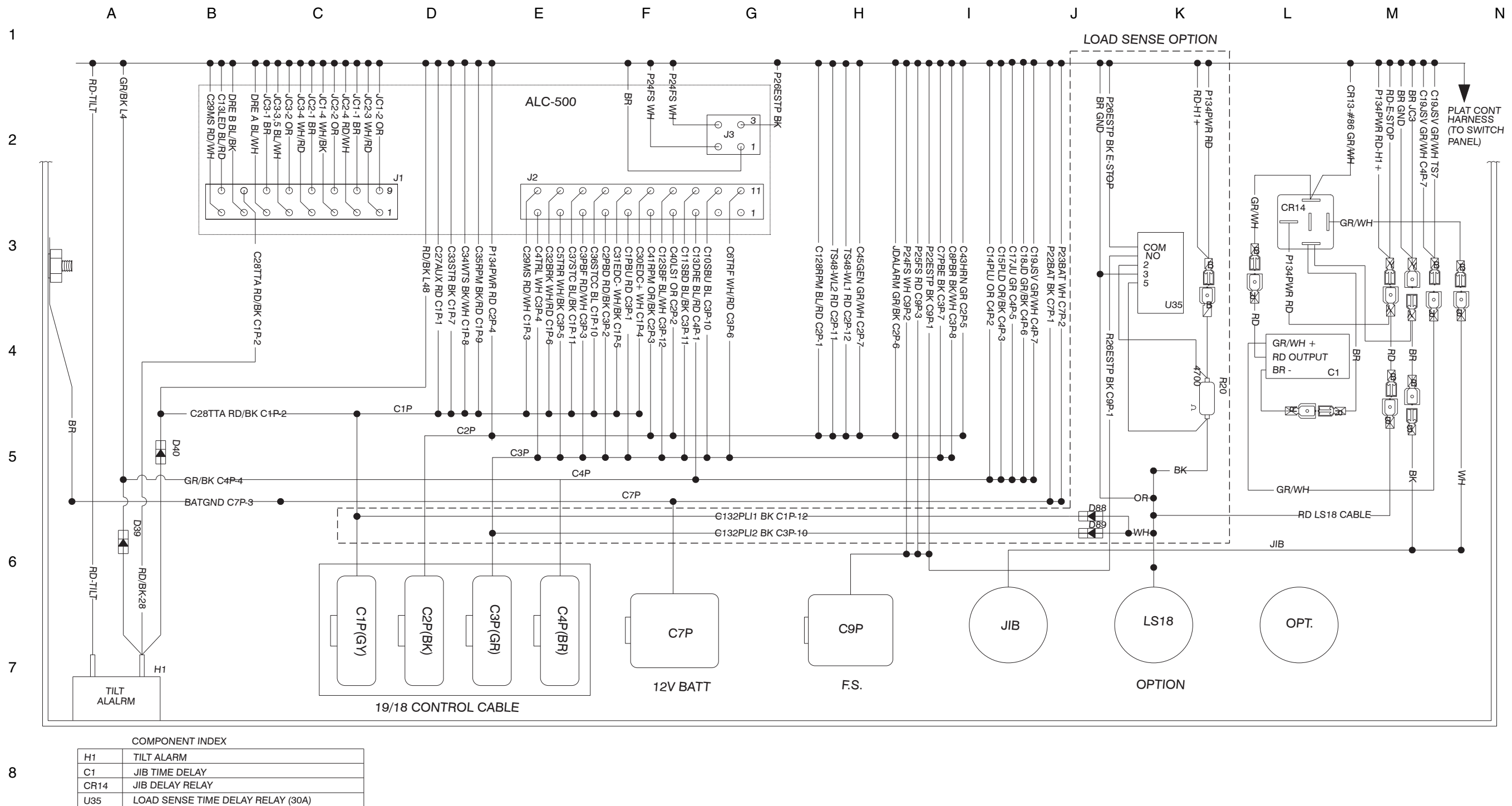


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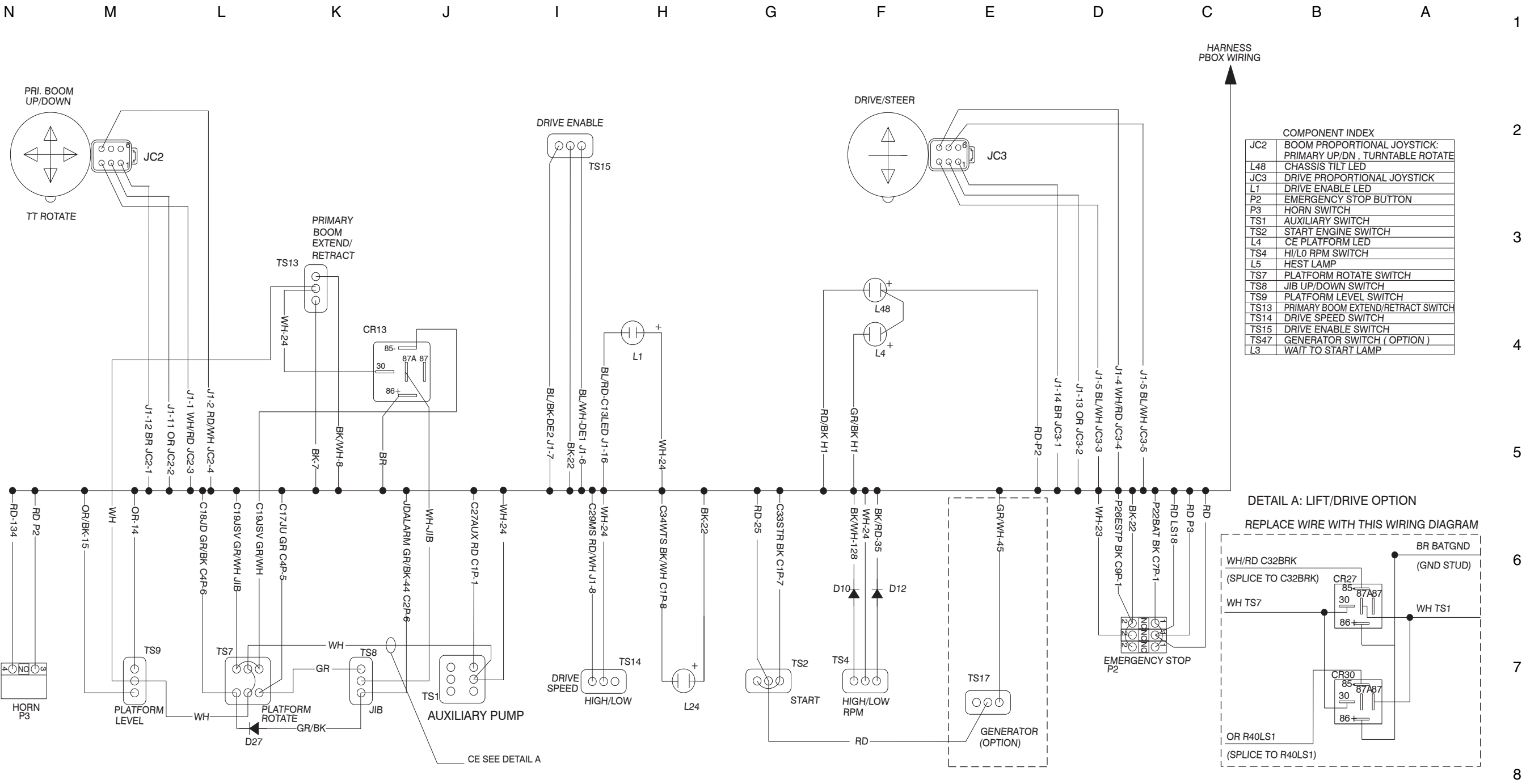
**Platform Control Box Wiring Diagram - ANSI**  
Deutz D 2.9 L4 Models



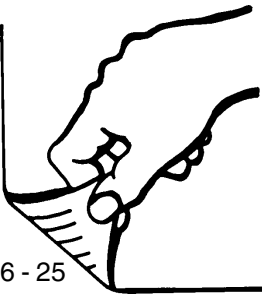
## Deutz D 2.9 L4 Models



Platform Switch Panel Wiring Diagram - ANSI  
Deutz D 2.9 L4 Models



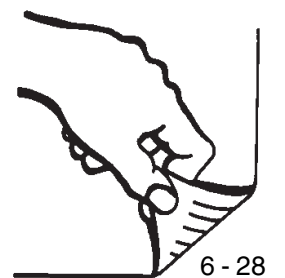
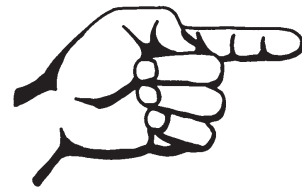
**Platform Switch Panel Wiring Diagram - ANSI**  
Deutz D 2.9 L4 Models



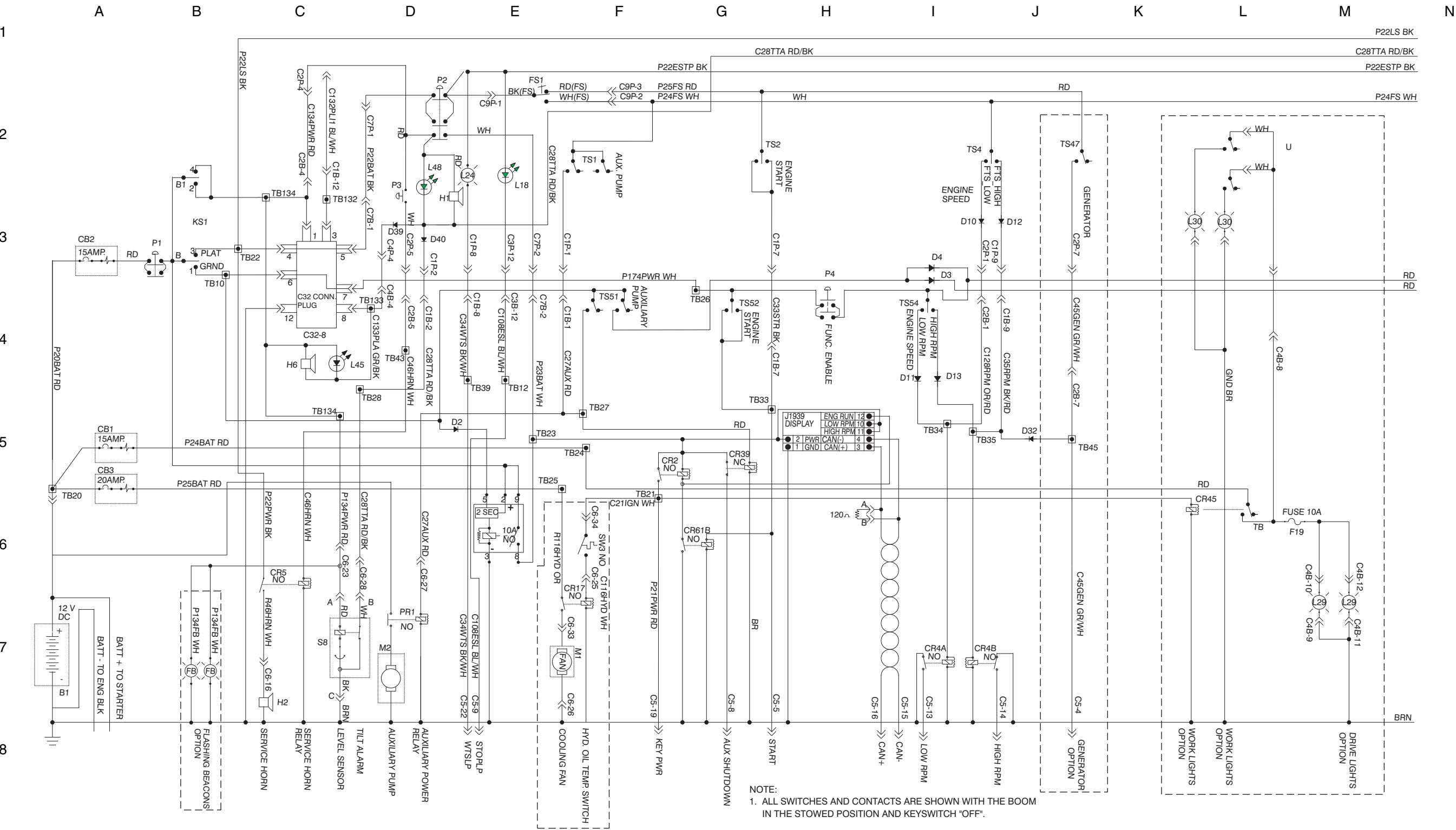


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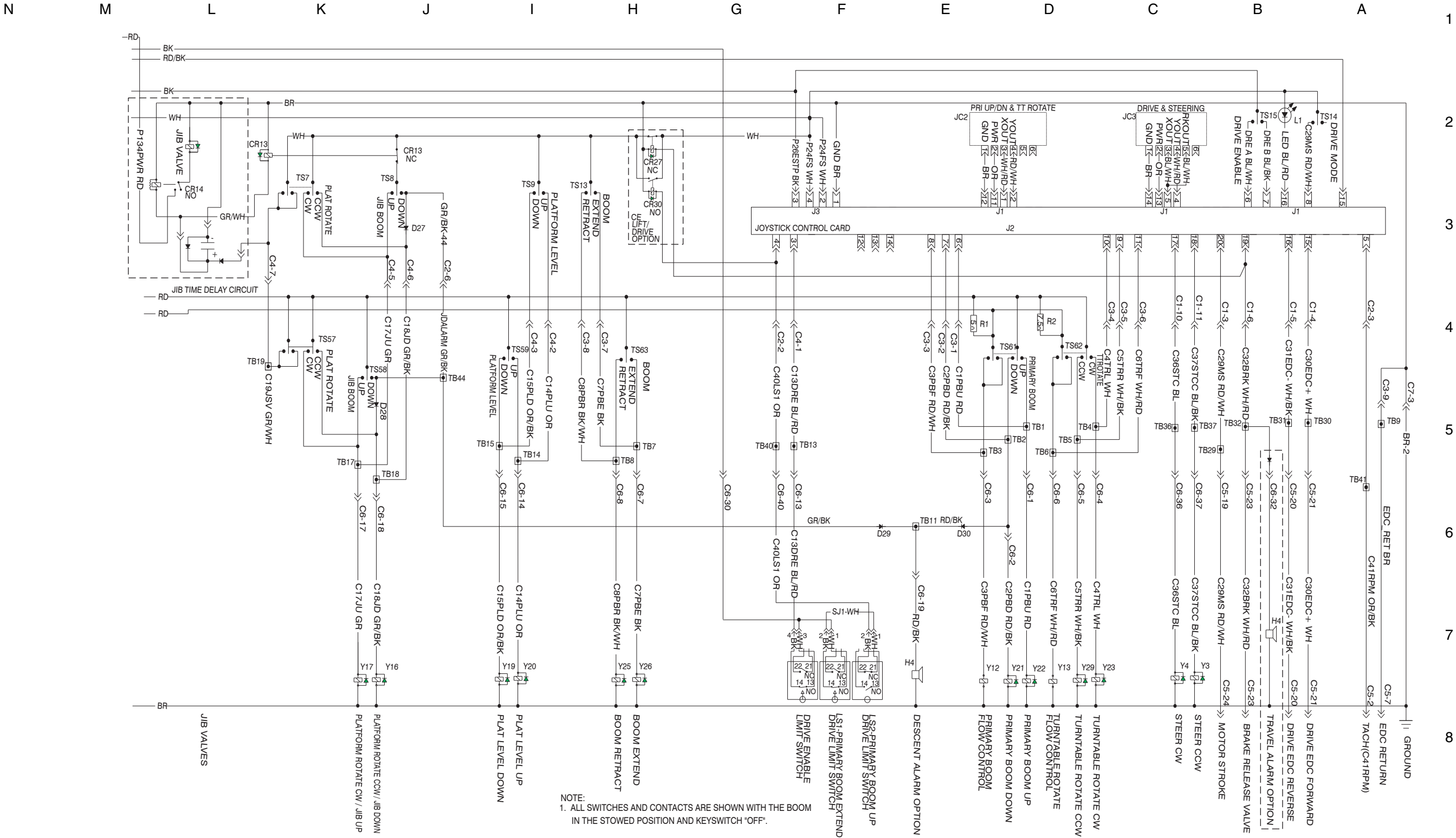
**Electrical Schematic - ANSI**  
Perkins 404F-22 Models



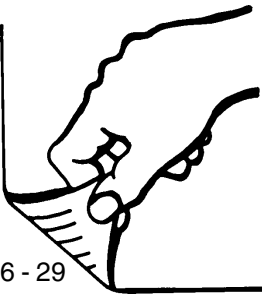
Electrical Schematic - ANSI  
Perkins 404F-22 Models



Electrical Schematic - ANSI  
Perkins 404F-22 Models

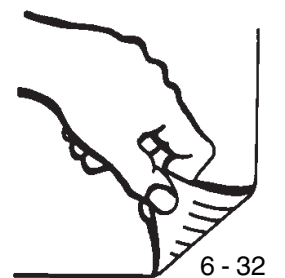
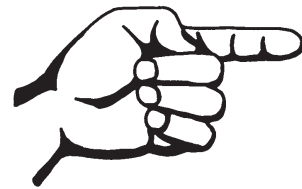


**Electrical Schematic - ANSI**  
Perkins 404F-22 Models

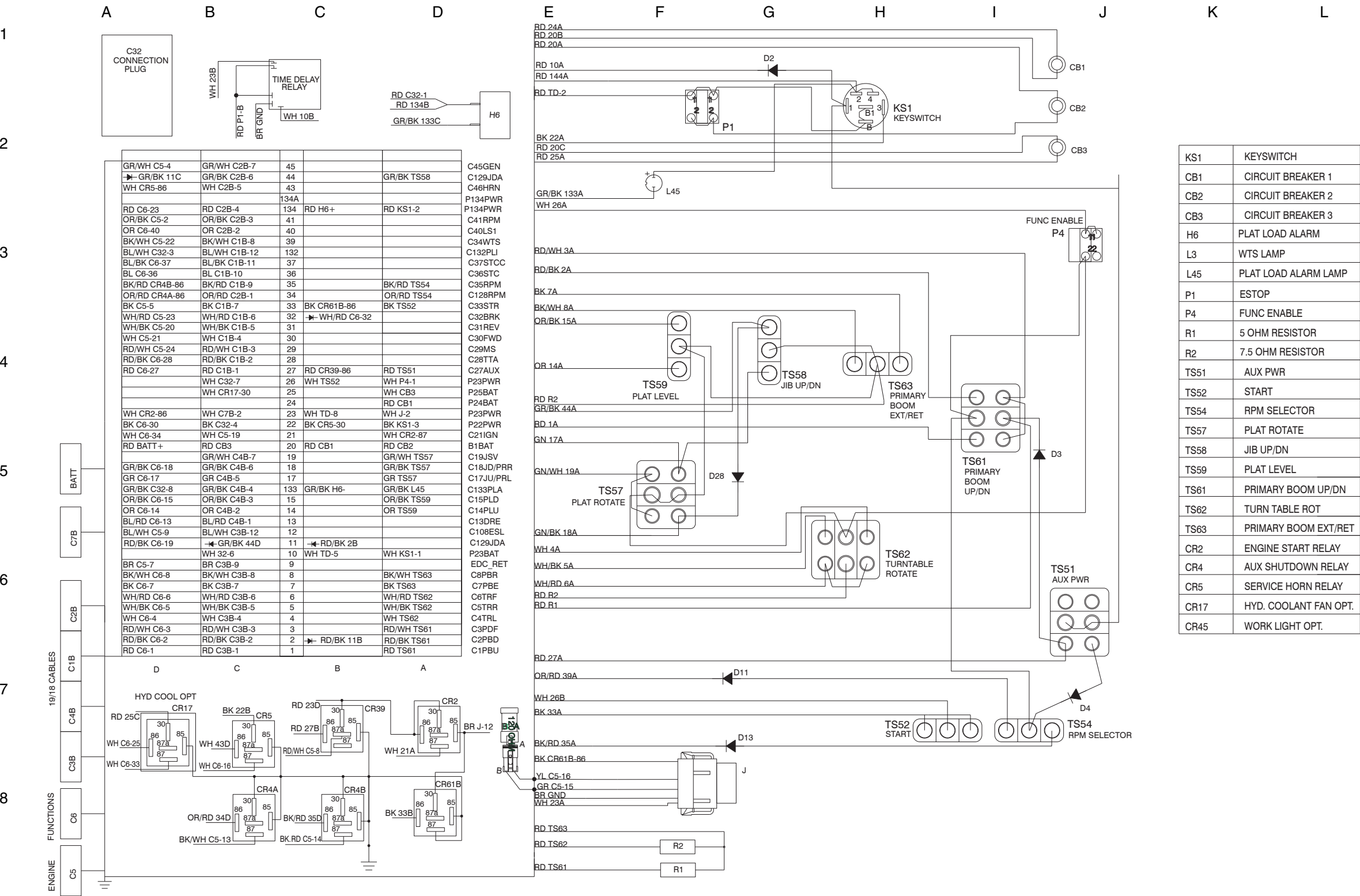


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**Ground Control Box Wiring Diagram - ANSI**  
Perkins 404F-22 Models

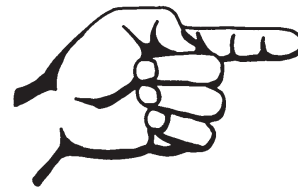


Ground Control Box Wiring Diagram - ANSI  
Perkins 404F-22 Models



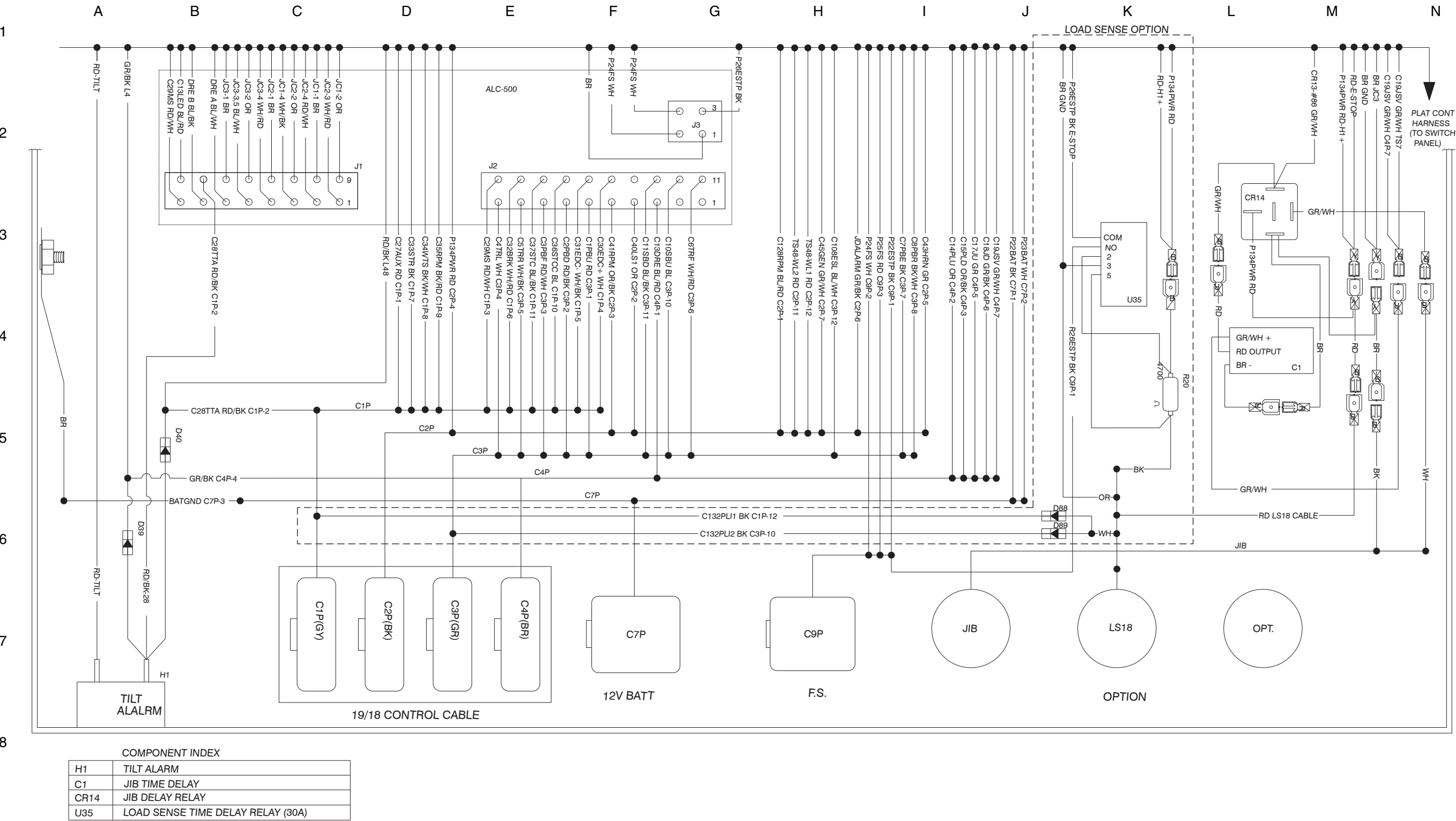
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**Platform Control Box Wiring Diagram - ANSI**  
Perkins 404F-22 Models



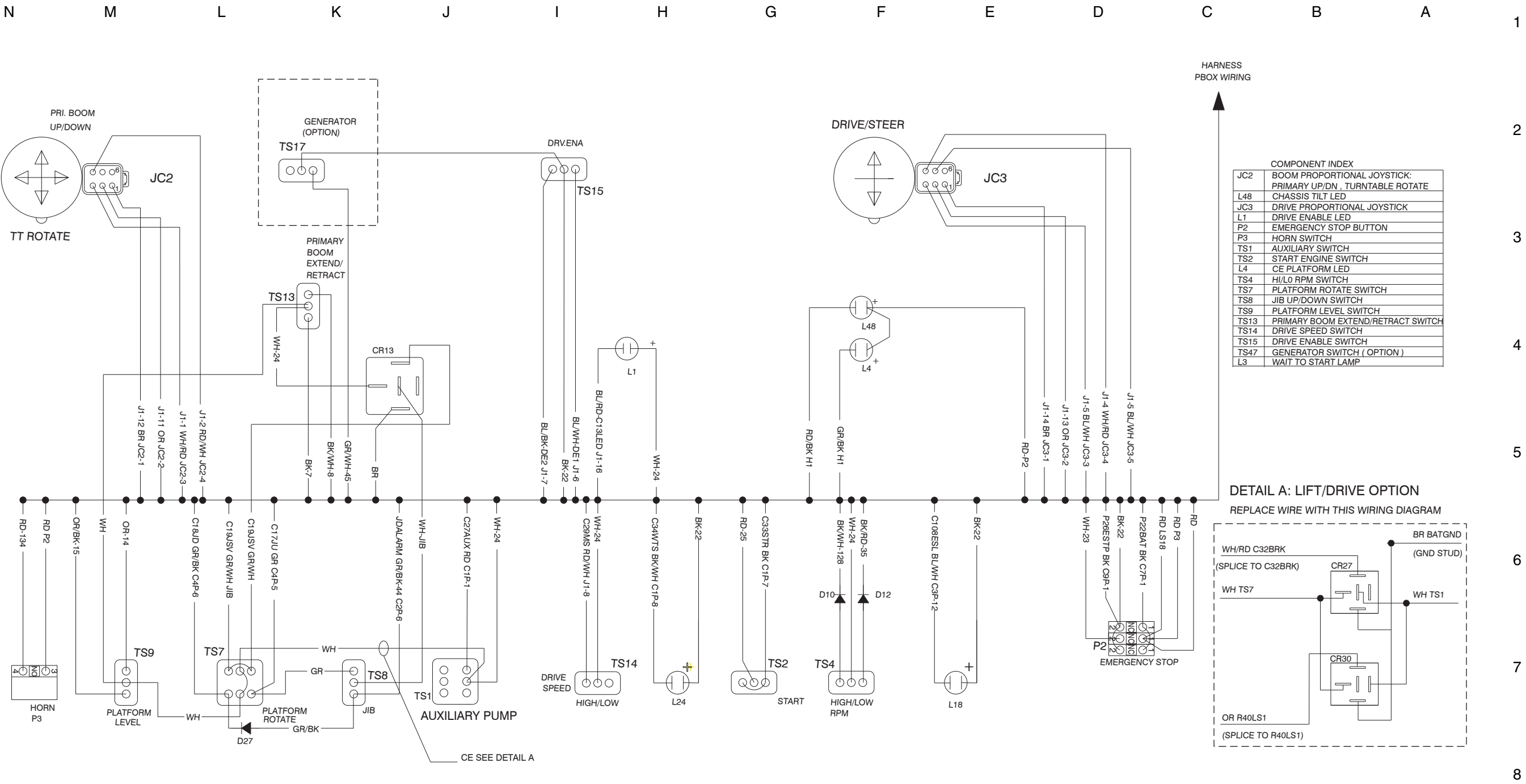
Platform Control Box Wiring Diagram - ANSI

Perkins 404F-22 Models

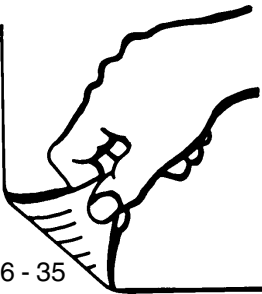




Platform Switch Panel Wiring Diagram - ANSI  
Perkins 404F-22 Models

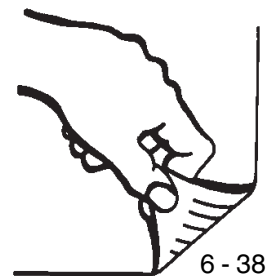
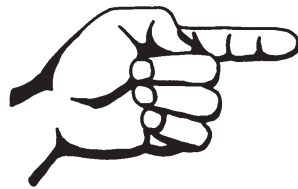


**Platform Switch Panel Wiring Diagram - ANSI**  
Perkins 404F-22 Models



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**Electrical Schematic - ANSI / CSA**  
Deutz D2011L03i and Perkins 404D-22 Models

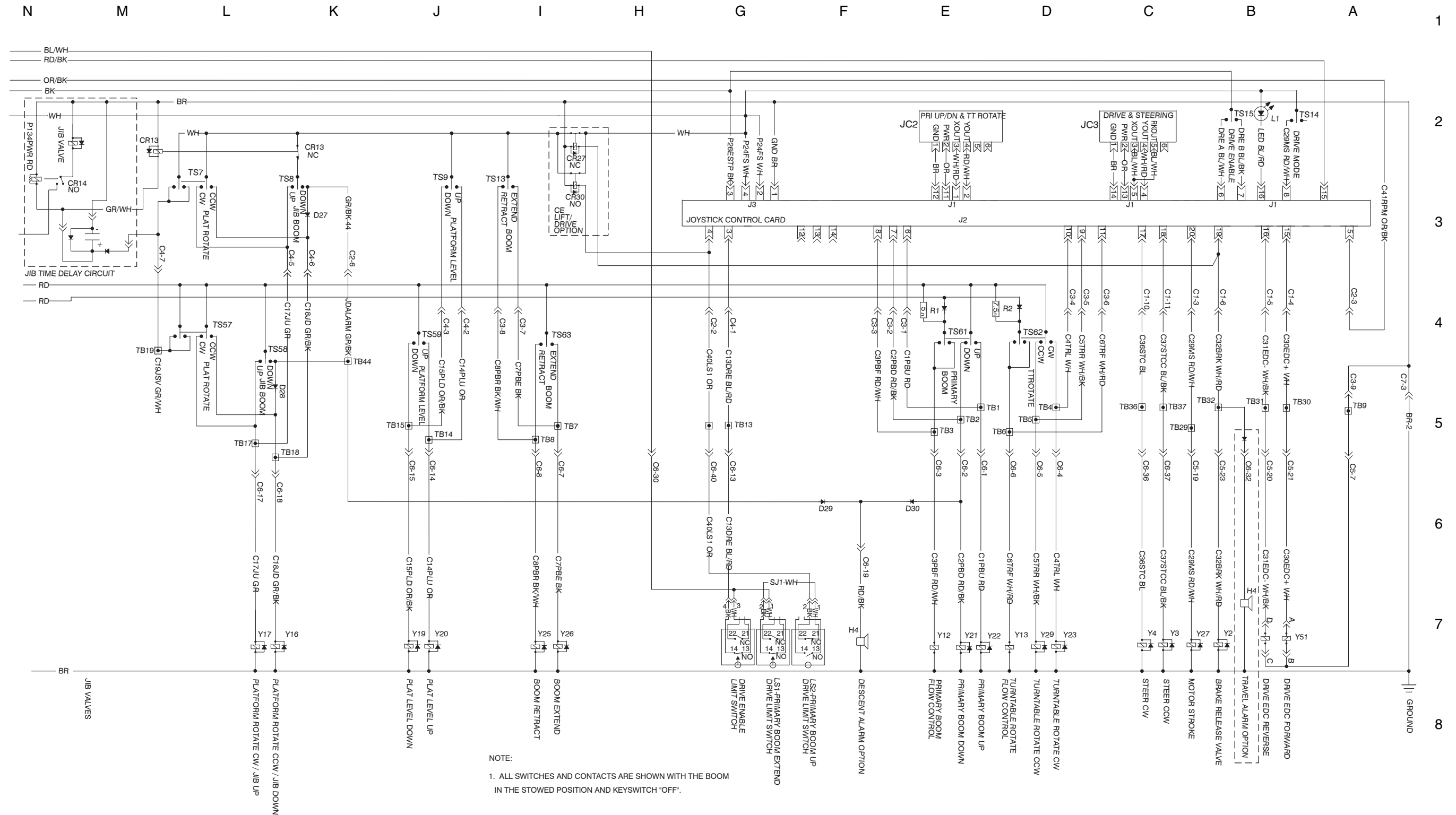


The diagram illustrates the electrical system for a 1994-1995 GM 2.3L engine. It shows the following components and their connections:

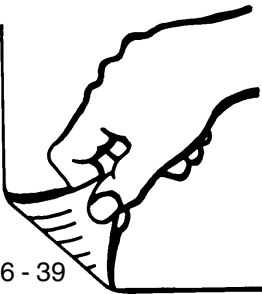
- Power Sources:** 12V DC battery, alternator, and glow plug options.
- Control Module:** GM/START MODULE, which manages the engine's operation.
- Engine Components:** Starter motor, fuel pump, auxiliary pump, and various sensors (TS1, TS2, TS4, TS5, TS6, TS7, TS8, TS9, TS10, TS11, TS12, TS13, TS14, TS15, TS16, TS17, TS18, TS19, TS20, TS21, TS22, TS23, TS24, TS25, TS26, TS27, TS28, TS29, TS30, TS31, TS32, TS33, TS34, TS35, TS36, TS37, TS38, TS39, TS40, TS41, TS42, TS43, TS44, TS45, TS46, TS47, TS48, TS49, TS50, TS51, TS52, TS53, TS54, TS55, TS56, TS57, TS58, TS59, TS60, TS61, TS62, TS63, TS64, TS65, TS66, TS67, TS68, TS69, TS70, TS71, TS72, TS73, TS74, TS75, TS76, TS77, TS78, TS79, TS80, TS81, TS82, TS83, TS84, TS85, TS86, TS87, TS88, TS89, TS90, TS91, TS92, TS93, TS94, TS95, TS96, TS97, TS98, TS99, TS100, TS101, TS102, TS103, TS104, TS105, TS106, TS107, TS108, TS109, TS110, TS111, TS112, TS113, TS114, TS115, TS116, TS117, TS118, TS119, TS120, TS121, TS122, TS123, TS124, TS125, TS126, TS127, TS128, TS129, TS130, TS131, TS132, TS133, TS134, TS135, TS136, TS137, TS138, TS139, TS140, TS141, TS142, TS143, TS144, TS145, TS146, TS147, TS148, TS149, TS150, TS151, TS152, TS153, TS154, TS155, TS156, TS157, TS158, TS159, TS160, TS161, TS162, TS163, TS164, TS165, TS166, TS167, TS168, TS169, TS170, TS171, TS172, TS173, TS174, TS175, TS176, TS177, TS178, TS179, TS180, TS181, TS182, TS183, TS184, TS185, TS186, TS187, TS188, TS189, TS190, TS191, TS192, TS193, TS194, TS195, TS196, TS197, TS198, TS199, TS200, TS201, TS202, TS203, TS204, TS205, TS206, TS207, TS208, TS209, TS210, TS211, TS212, TS213, TS214, TS215, TS216, TS217, TS218, TS219, TS220, TS221, TS222, TS223, TS224, TS225, TS226, TS227, TS228, TS229, TS230, TS231, TS232, TS233, TS234, TS235, TS236, TS237, TS238, TS239, TS240, TS241, TS242, TS243, TS244, TS245, TS246, TS247, TS248, TS249, TS250, TS251, TS252, TS253, TS254, TS255, TS256, TS257, TS258, TS259, TS260, TS261, TS262, TS263, TS264, TS265, TS266, TS267, TS268, TS269, TS270, TS271, TS272, TS273, TS274, TS275, TS276, TS277, TS278, TS279, TS280, TS281, TS282, TS283, TS284, TS285, TS286, TS287, TS288, TS289, 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1. ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

## Electrical Schematic - ANSI / CSA

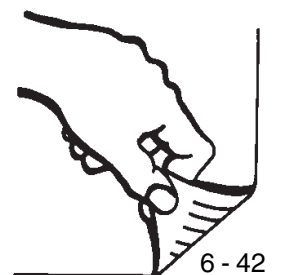
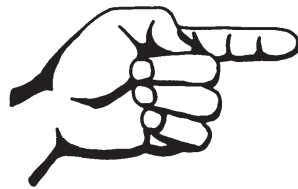


**Electrical Schematic - ANSI / CSA**  
Deutz D2011L03i and Perkins 404D-22 Models



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**Ground Control Box Wiring Diagram - ANSI / CSA**  
Deutz D2011L03i and Perkins 404D-22 Models



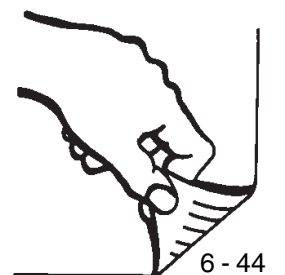
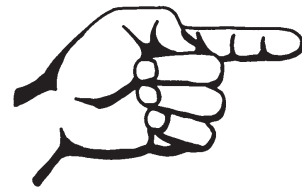
**WIRING HARNESS TO BASE**

DESCRIPTION	LABEL
EMERGENCY STOP BUTTON	P1
KEY SWITCH	KS1
AUXILIARY SWITCH	TS51
ENGINE START SWITCH	TS52
STARTER AID	TS56
FUNCTION ENABLE	TS55
PLATFORM ROTATE SWITCH	TS57
PLATFORM LEVEL SWITCH	TS59
BOOM EXTEND/RETRACT SWITCH	TS63
PRIMARY BOOM UP/DOWN SWITCH	TS61
TURNTABLE ROTATE SWITCH	TS62
JIB BOOM UP/DOWN SWITCH	TS58
CIRCUIT BREAKER, CONTROLS, 15A	CB1
CIRCUIT BREAKER, ENGINE, 15A	CB2
CIRCUIT BREAKER, OPTIONS, 20A	CB3
RESISTOR, 5 OHM, BOOM FUNCTION	R1
RESISTOR, 7.5 OHM, TURNTABLE FUNCT	R2
VOLT METER GAGE	G1
OIL PRESSURE GAGE	G2
OIL TEMP GAGE	G3
CHECK ENG LED	L2
HOUR METER	HM
IGN. START RELAY	CR1
IGN. POWER RELAY	CR2
HIGH IDLE (RPM) CUTOUT RELAY	CR3
RPM RELAY	CR4
HORN RELAY	CR5
COOLING FAN RELAY	CR17
PLATFORM OVERLOAD ALARM	H6
PLAT OVERLOAD MODULE	U33
LOAD SENSE TIME DELAY RELAY (10A)	U34
PLAT OVERLOAD LED	L45



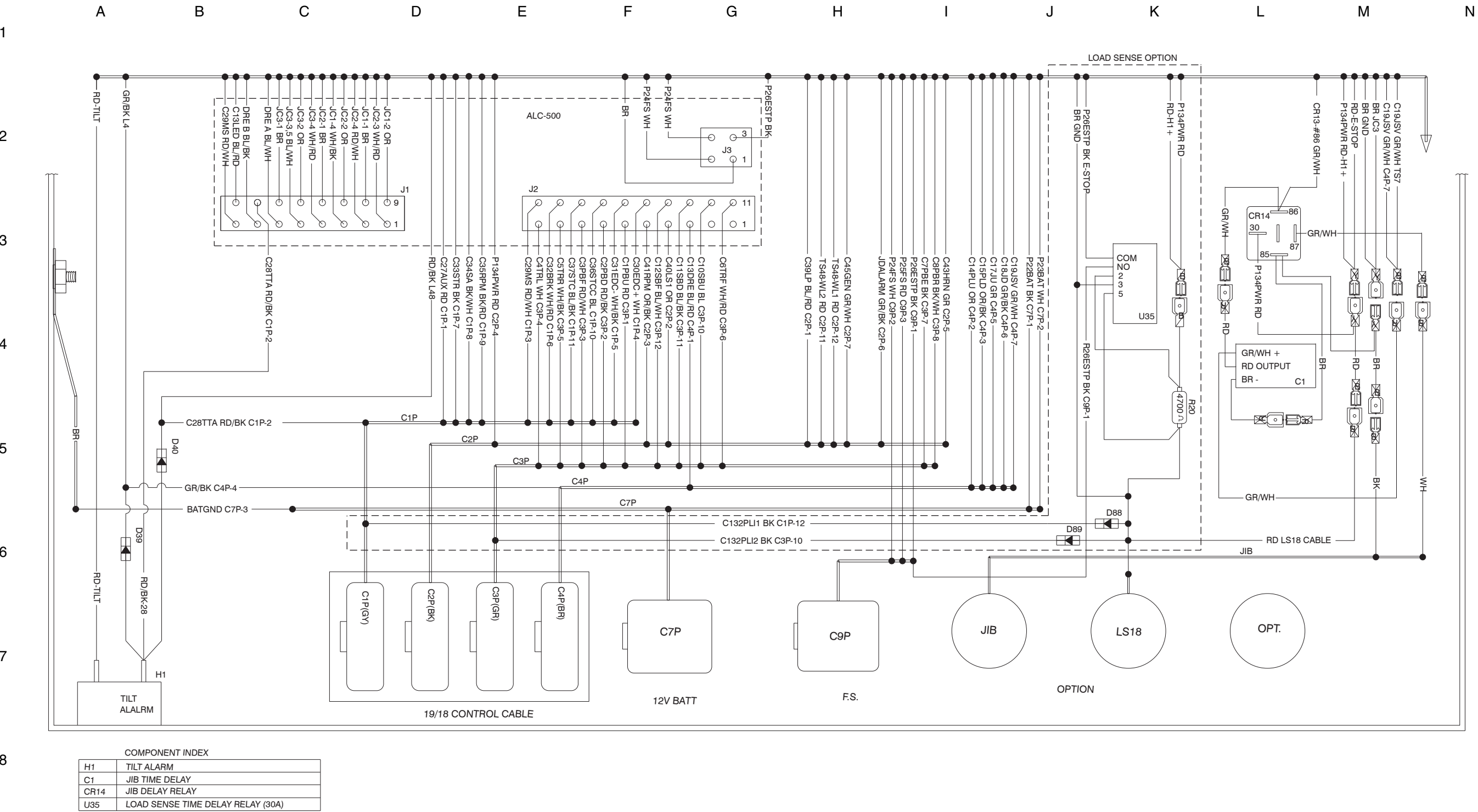
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**Platform Control Box Wiring Diagram - ANSI / CSA**  
Deutz D2011L03i and Perkins 404D-22 Models

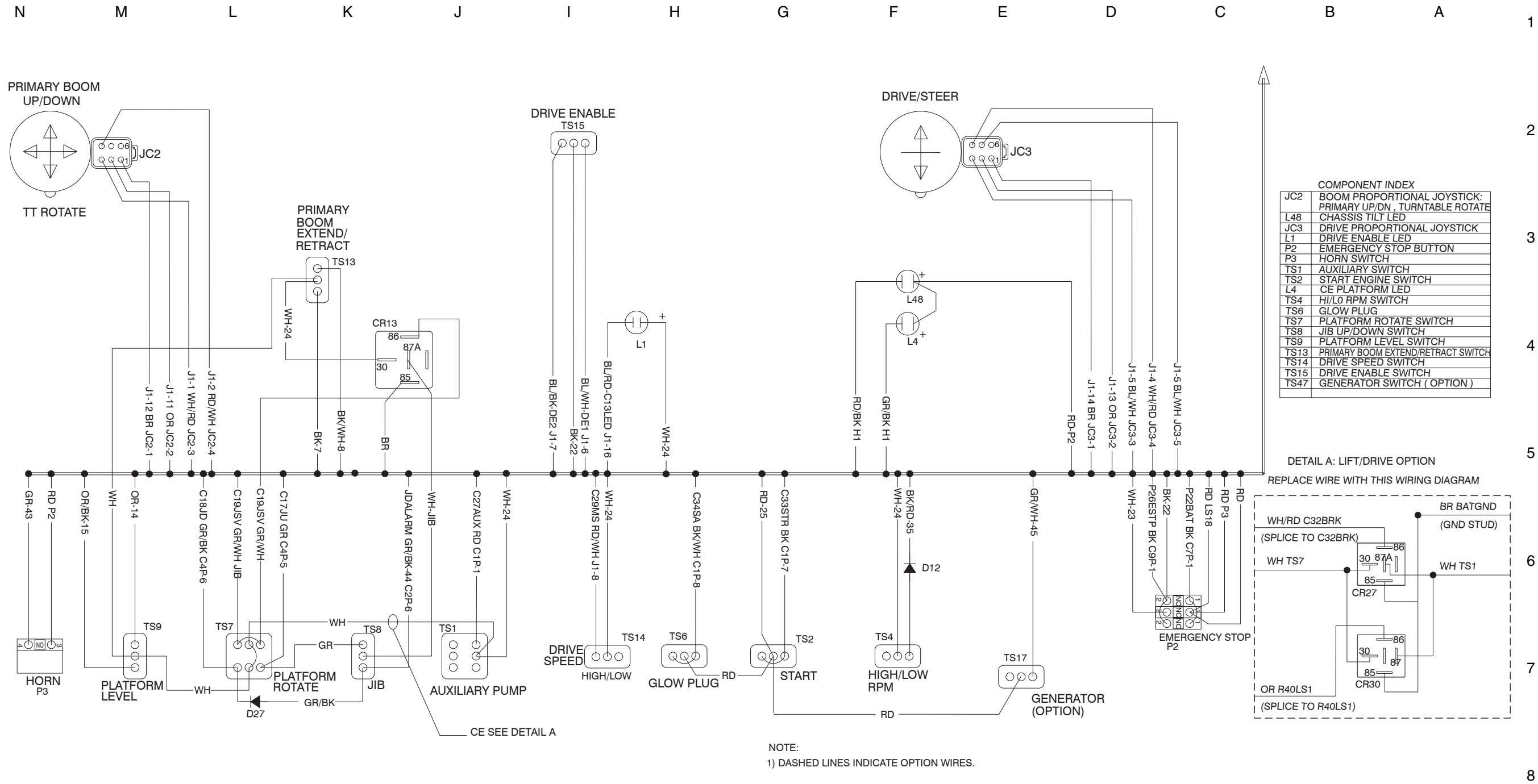


Platform Control Box Wiring Diagram-ANSI / CSA

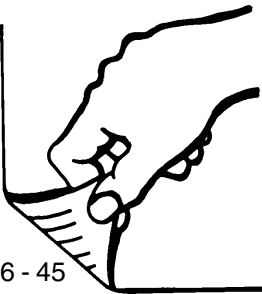
Deutz D2011L03i and Perkins 404D-22 Models



Platform Switch Panel Wiring Diagram - ANSI / CSA  
Deutz D2011L03i and Perkins 404D-22 Models

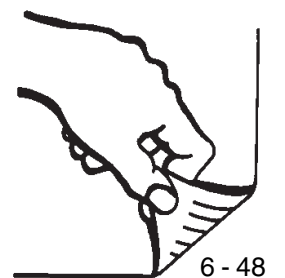
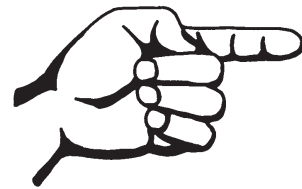


**Platform Switch Panel Wiring Diagram - ANSI / CSA**  
Deutz D2011L03i and Perkins 404D-22 Models

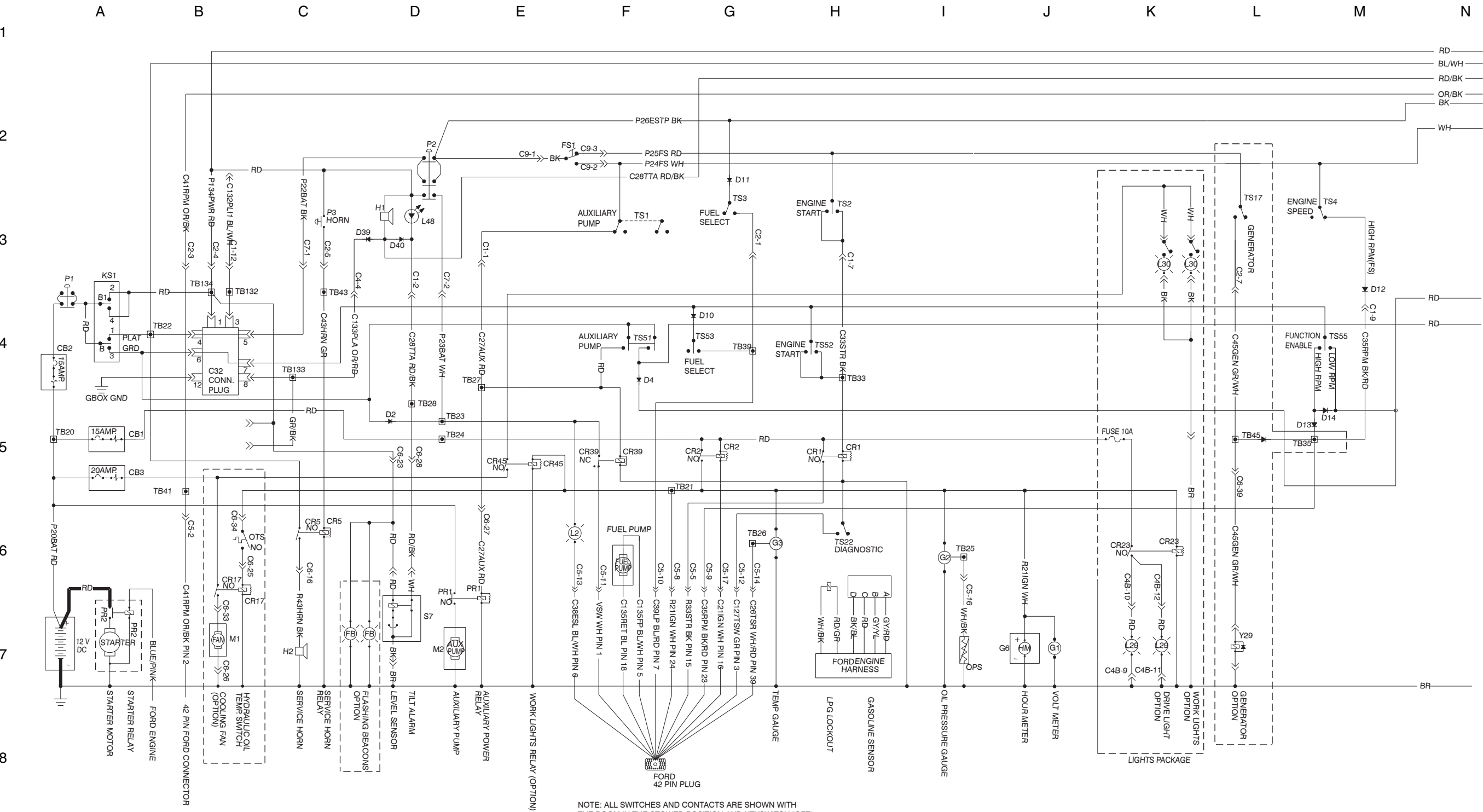


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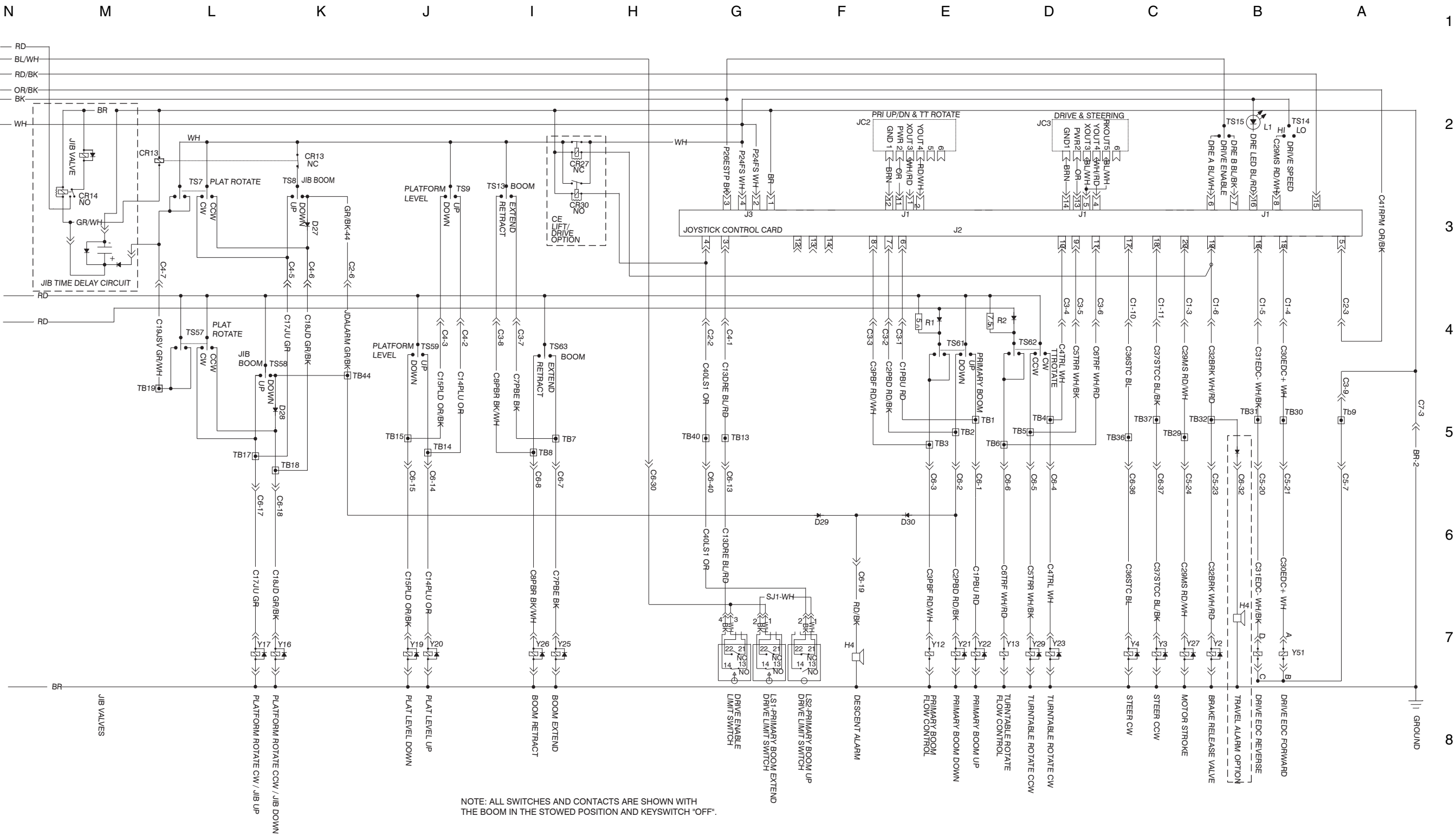
**Electrical Schematic - ANSI / CSA**  
Ford MSG-425 EFI Models



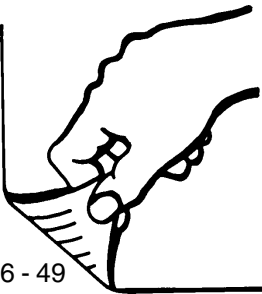
Electrical Schematic - ANSI / CSA  
Ford MSG-425 EFI Models



Electrical Schematic - ANSI / CSA  
Ford MSG-425 EFI Models



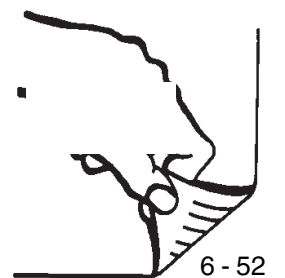
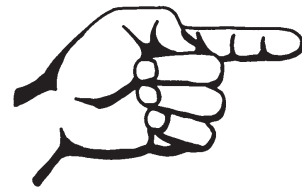
**Electrical Schematic - ANSI / CSA**  
Ford MSG-425 EFI Models

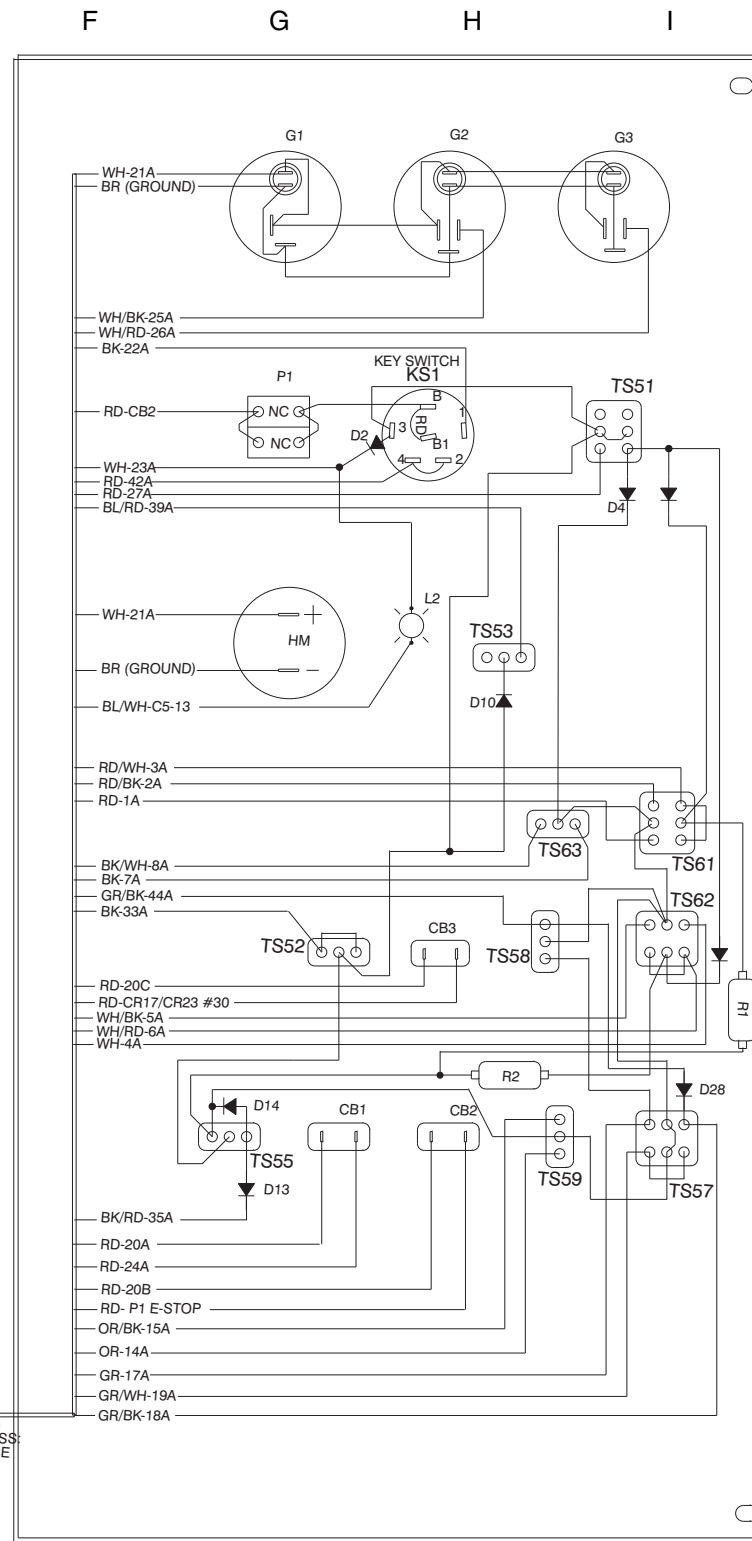




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**Ground Control Box Wiring Diagram - ANSI / CSA**  
Ford MSG-425 EFI Models



[illegible]

WH-TR23B 8

WH-CR39#30 9

RD-TB134(A)C 2

BR-GND 3

BK-C3B-10 5

U34

Diagram showing the CR23130 component and its connections:

- CR23130
- 86
- 85
- 87
- BN-GND
- RD C4B-10
- RD C4B-12
- WH-21B

WORK LIGHT OPTION RELAY

ACT

RD-20C

CR45 30

86 85 BR-GND

87

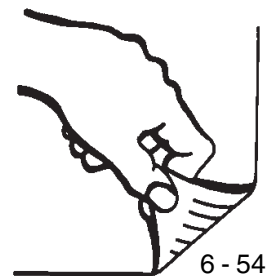
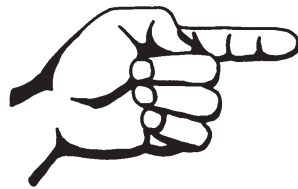
WH-W.L. CAB

WH-21C

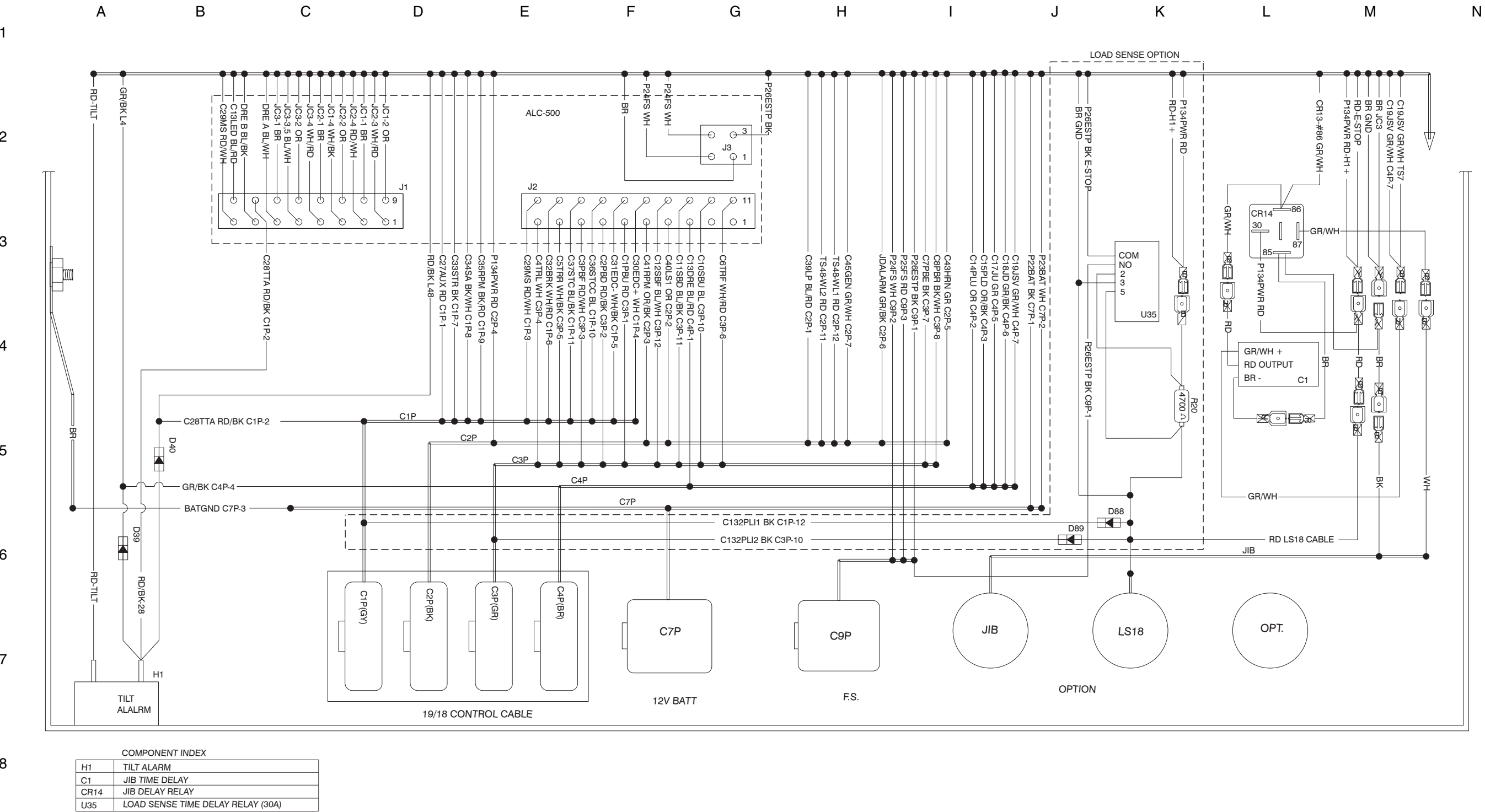
DESCRIPTION	LABEL
EMERGENCY STOP BUTTON	P1
KEY SWITCH	KS1
AUXILIARY SWITCH	TS51
ENGINE START SWITCH	TS52
LP/GAS SWITCH	TS53
FUNCTION ENABLE	TS55
PLATFORM ROTATE SWITCH	TS57
PLATFORM LEVEL SWITCH	TS59
BOOM EXTEND/RETRACT SWITCH	TS63
PRIMARY BOOM UP/DOWN SWITCH	TS61
TURNTABLE ROTATE SWITCH	TS62
JIB BOOM UP/DOWN SWITCH	TS58
CHECK ENGINE SWITCH	TS22
CIRCUIT BREAKER, CONTROLS, 15A	CB1
CIRCUIT BREAKER, ENGINE, 15A	CB2
CIRCUIT BREAKER, OPTIONS, 20A	CB3
RESISTOR, 5 OHM, BOOM FUNCTION	R1
RESISTOR, 7.5 OHM,TURNTABLE FUNCT	R2
VOLT METER GAGE	G1
OIL PRESSURE GAGE	G2
WATER TEMP GAGE	G3
CHECK ENGINE	L2
HOURLY METER	HM
LOAD SENSE TIME DELAY RELAY (10A)	U34

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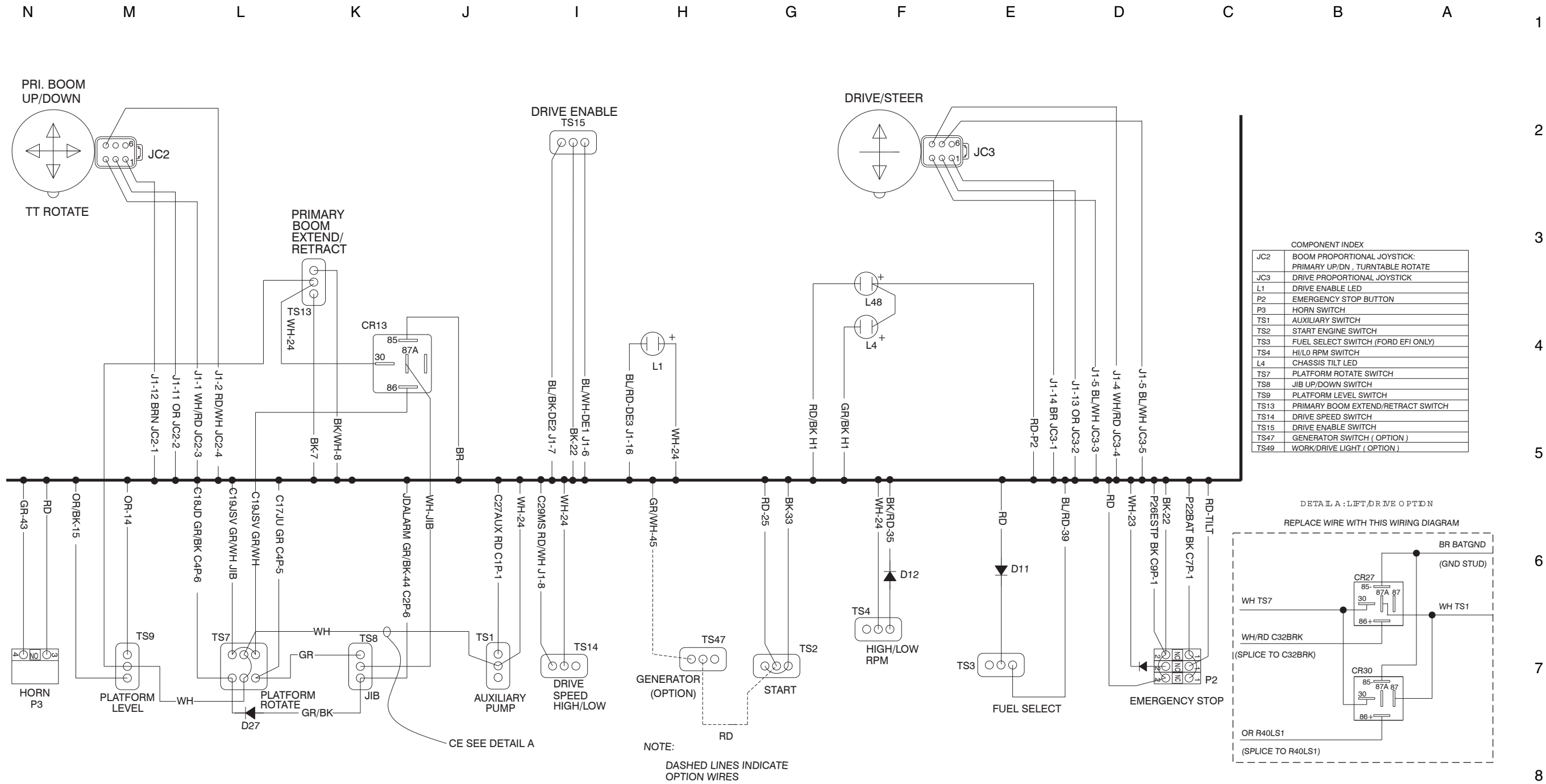
**Platform Control Box Wiring Diagram - ANSI / CSA**  
Ford MSG-425 EFI Models



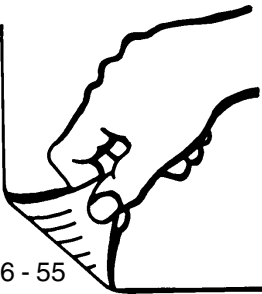
Platform Control Box Wiring Diagram - ANSI / CSA  
Ford MSG-425 EFI Models



Platform Switch Panel Wiring Diagram - ANSI / CSA  
Ford MSG-425 EFI Models

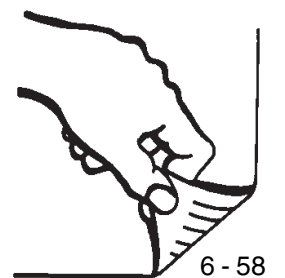
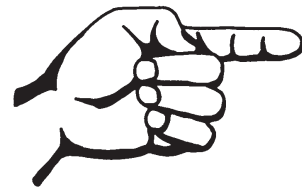


**Platform Switch Panel Wiring Diagram - ANSI / CSA**  
Ford MSG-425 EFI Models



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**Electrical Schematic - CE**  
Deutz D2011L03i and Perkins 404D-22 Models

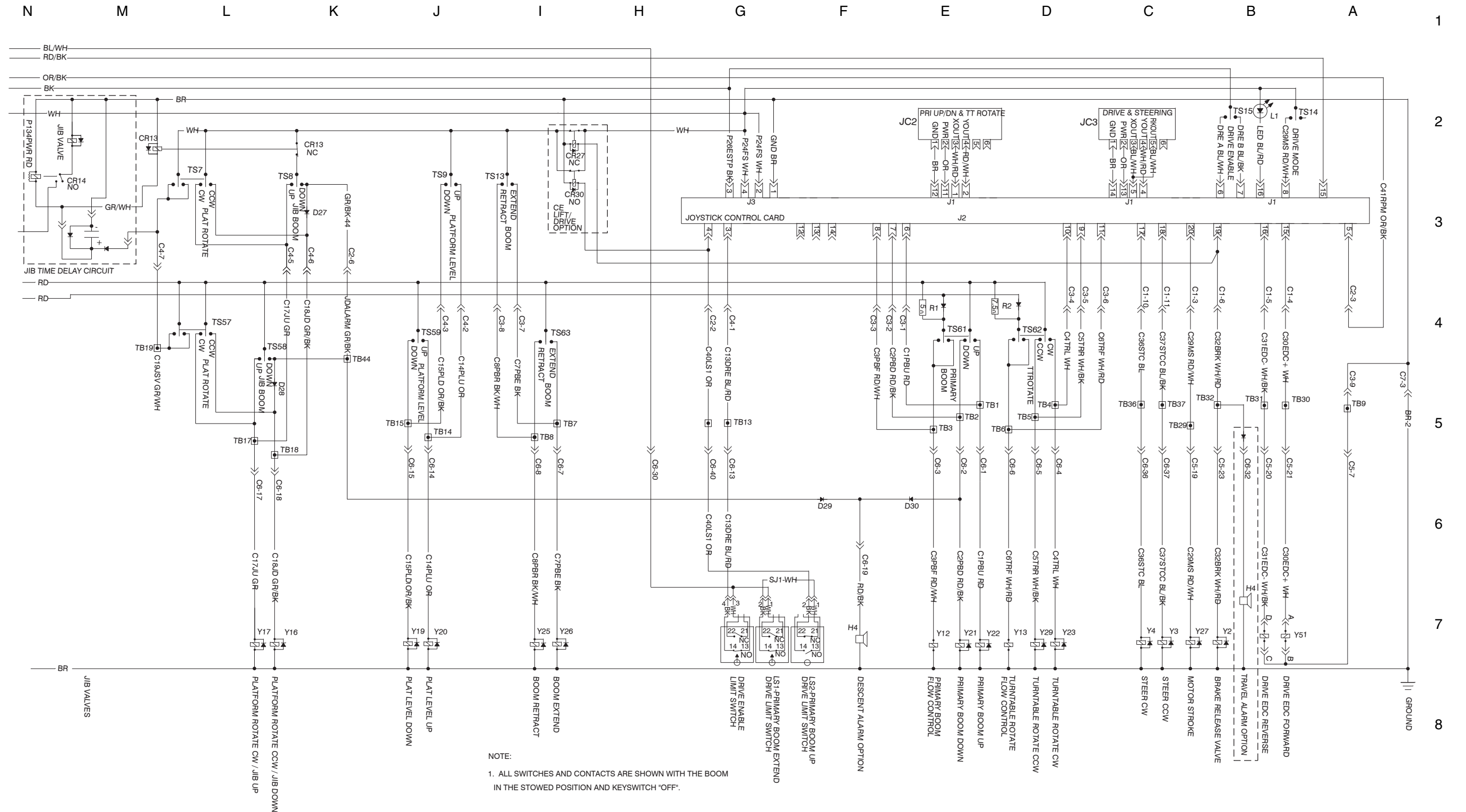


## Deutz D2011L03i and Perkins 404D-22 Models

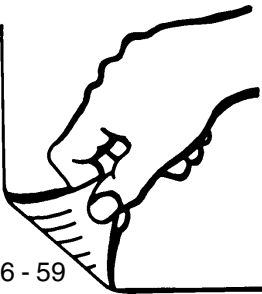




## Electrical Schematic - CE

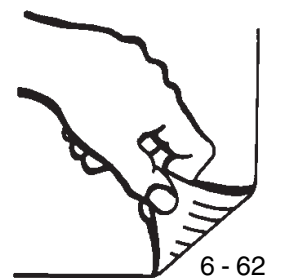
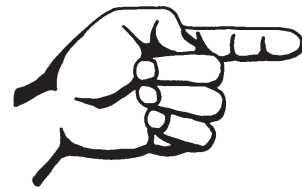


**Electrical Schematic - CE**  
Deutz D2011L03i and Perkins 404D-22 Models

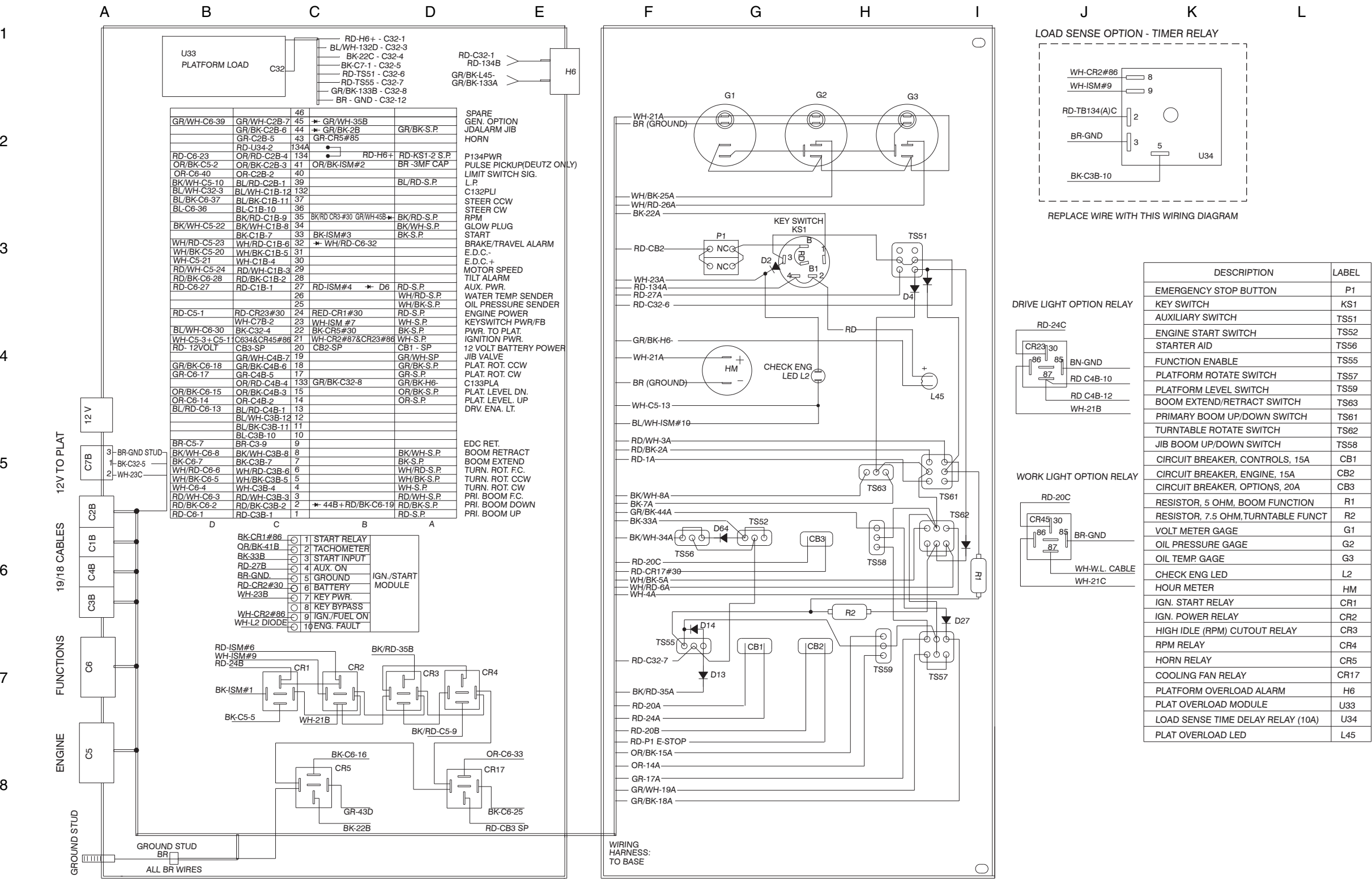


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**Ground Control Box Wiring Diagram - CE**  
Deutz D2011L03i and Perkins 404D-22 Models

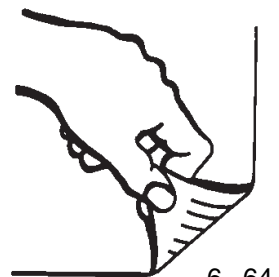
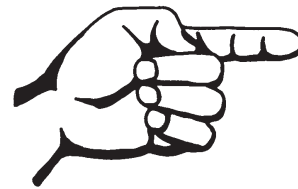


Ground Control Box Wiring Diagram - CE  
Deutz D2011L03i and Perkins 404D-22 Models

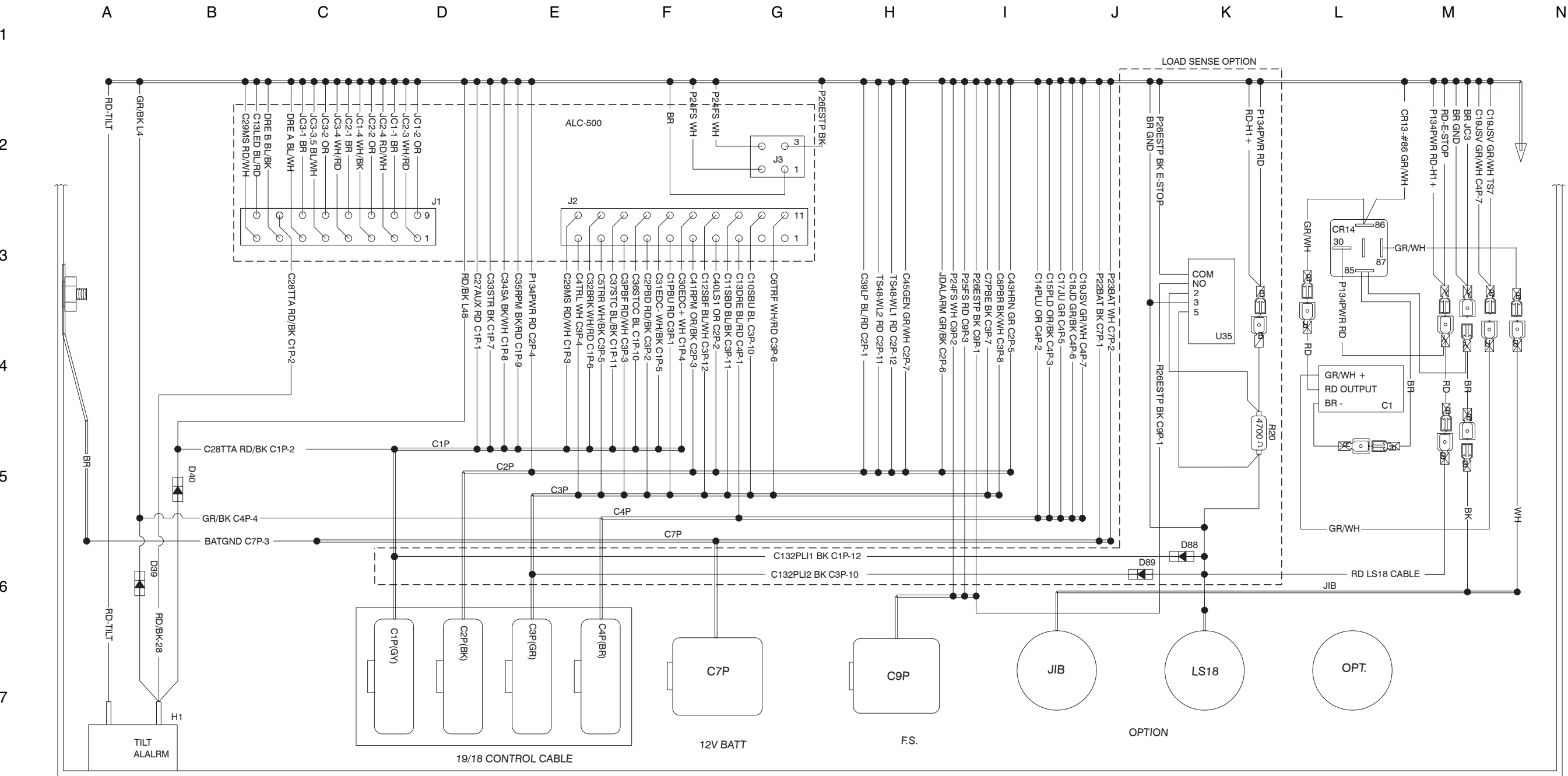


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**Platform Control Box Wiring Diagram - CE**  
Deutz D2011L03i and Perkins 404D-22 Models

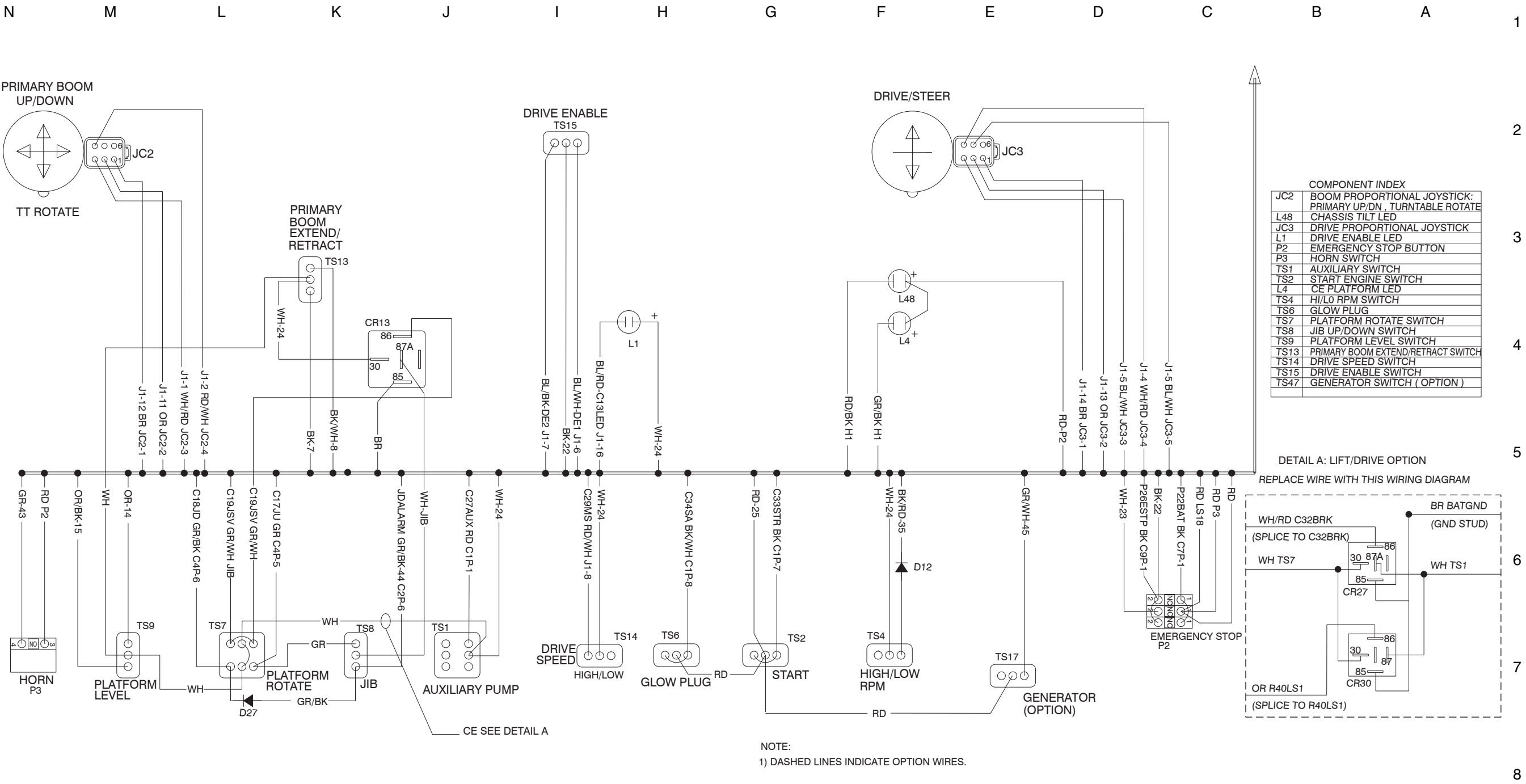


Platform Control Box Wiring Diagram - CE  
Deutz D2011L03i and Perkins 404D-22 Models

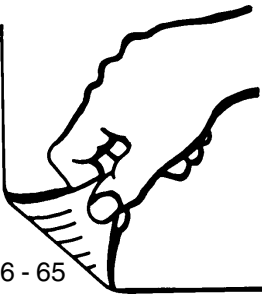


COMPONENT INDEX	
H1	TILT ALARM
C1	JIB TIME DELAY
CR14	JIB DELAY RELAY
U35	LOAD SENSE TIME DELAY RELAY (30A)

Platform Switch Panel Wiring Diagram - CE  
Deutz D2011L03i and Perkins 404D-22 Models



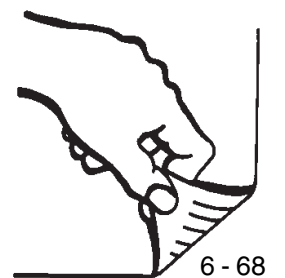
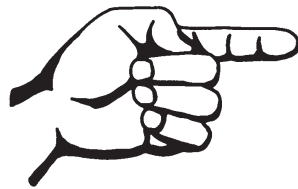
**Platform Switch Panel Wiring Diagram - CE**  
Deutz D2011L03i and Perkins 404D-22 Models



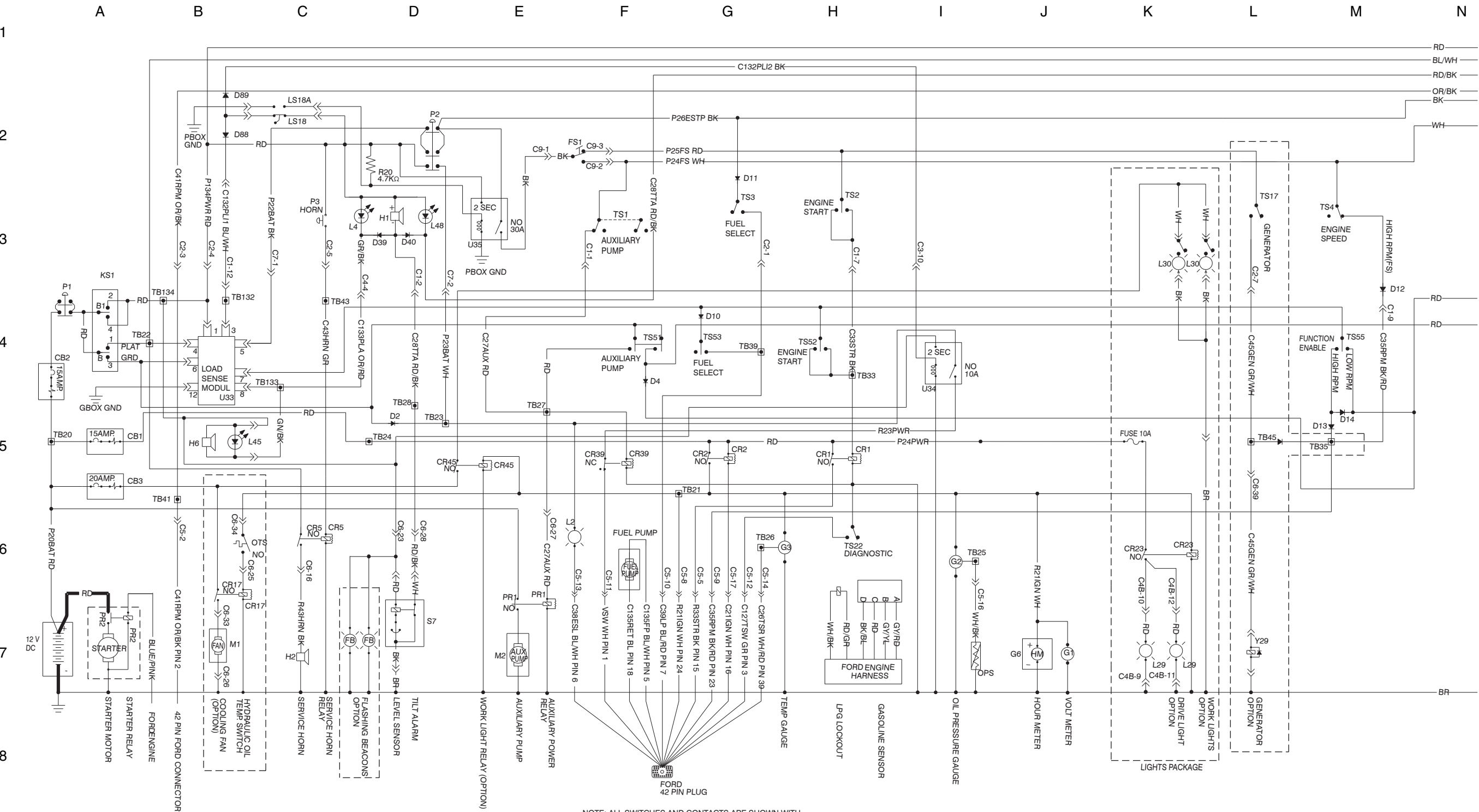


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**Electrical Schematic - CE**  
Ford MSG-425 EFI Models

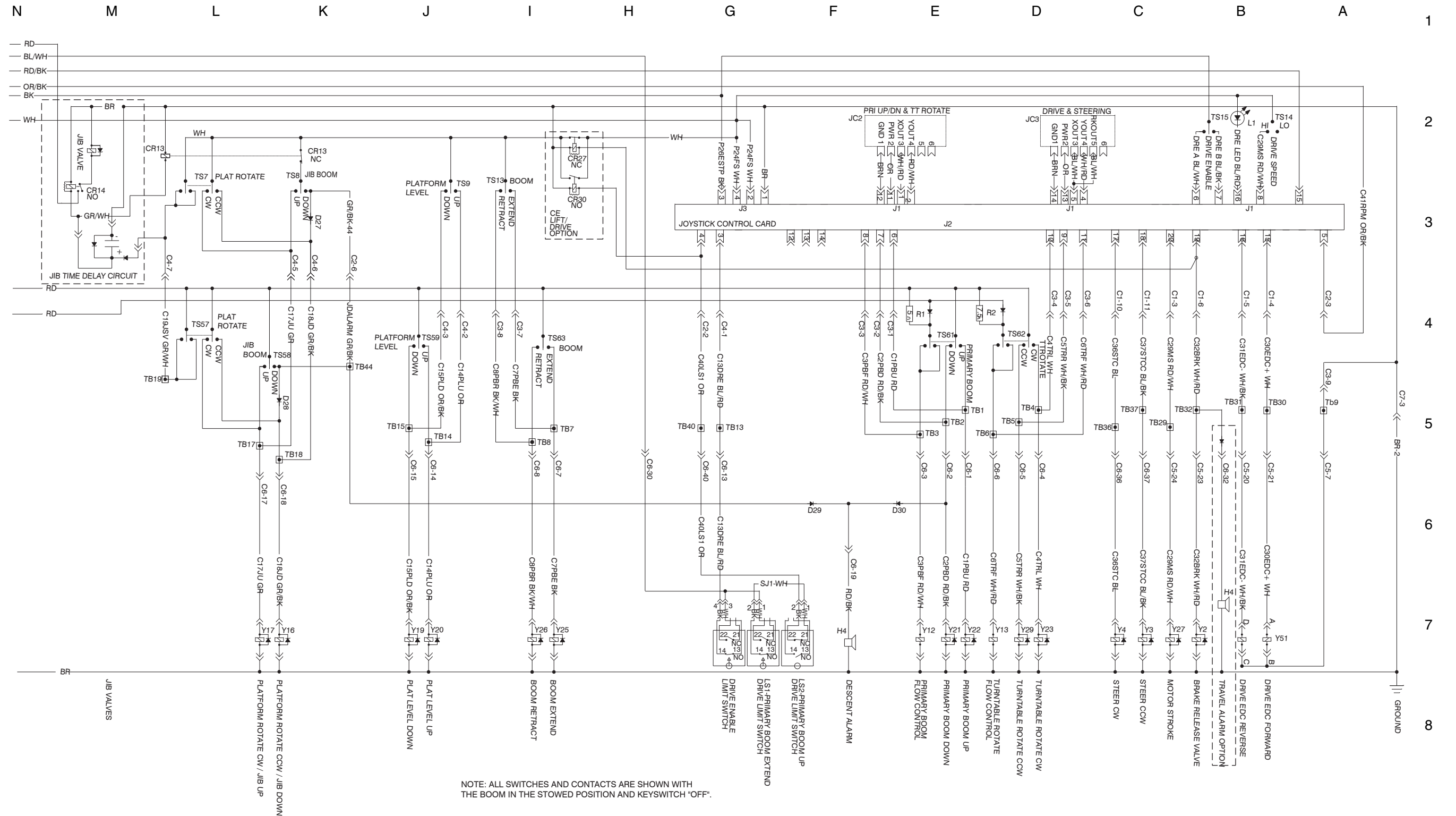


Electrical Schematic - CE  
Ford MSG-425 EFI Models



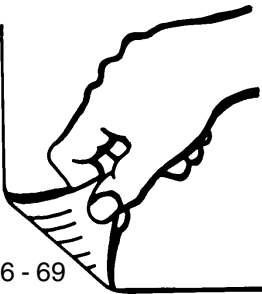
NOTE: ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

## Electrical Schematic - CE



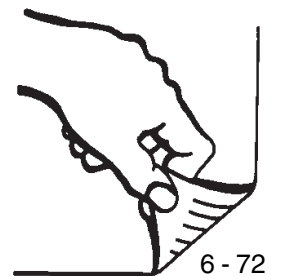
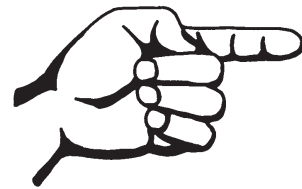
NOTE: ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF"

**Electrical Schematic - CE**  
Ford MSG-425 EFI Models



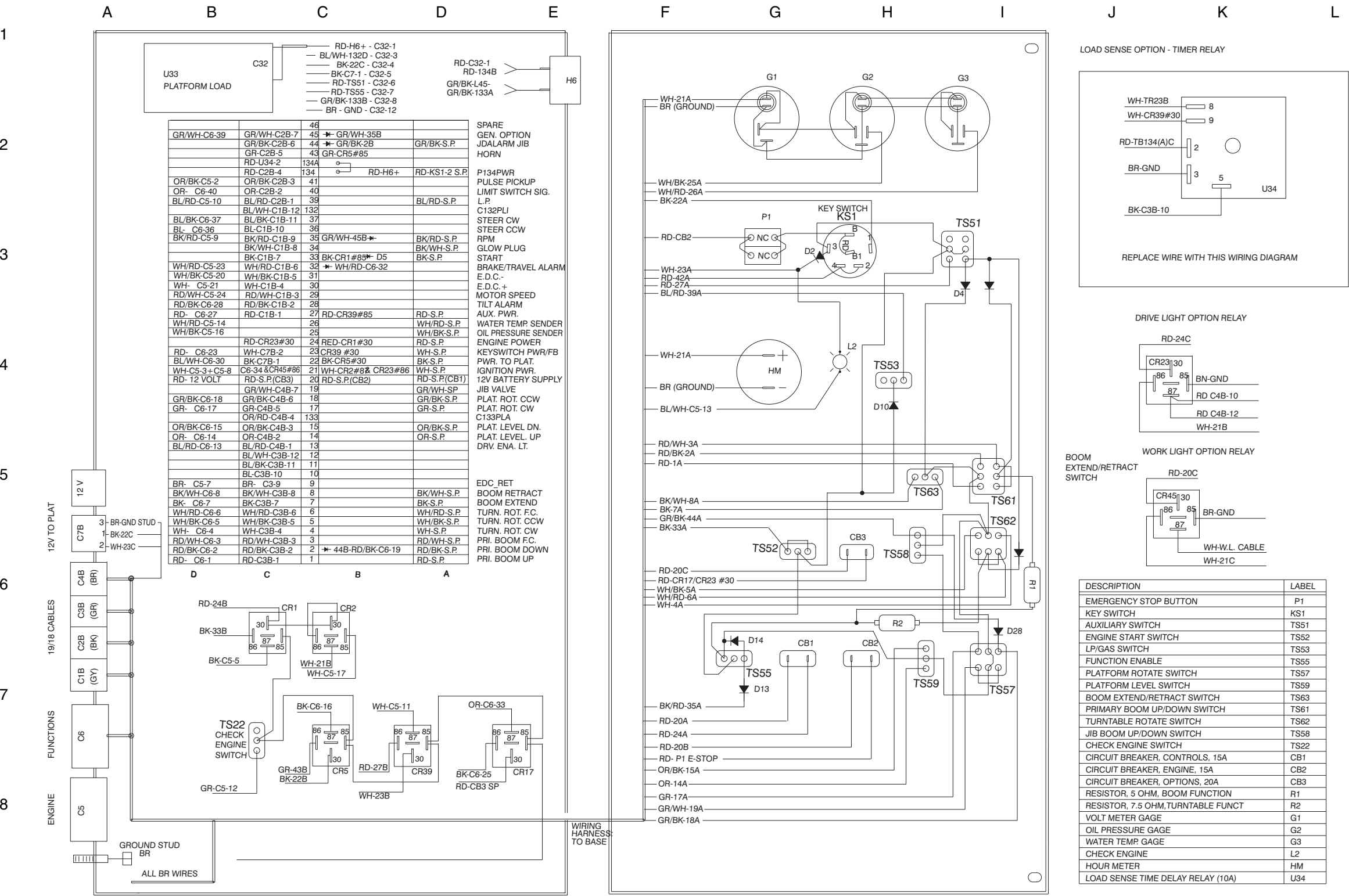
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**Ground Control Box Wiring Diagram - CE**  
Ford MSG-425 EFI Models



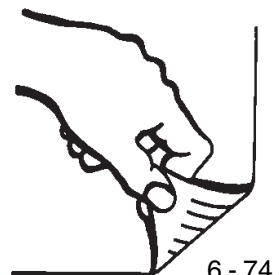
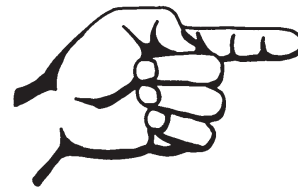
Ground Control Box Wiring Diagram - CE

Ford MSG-425 EFI Models

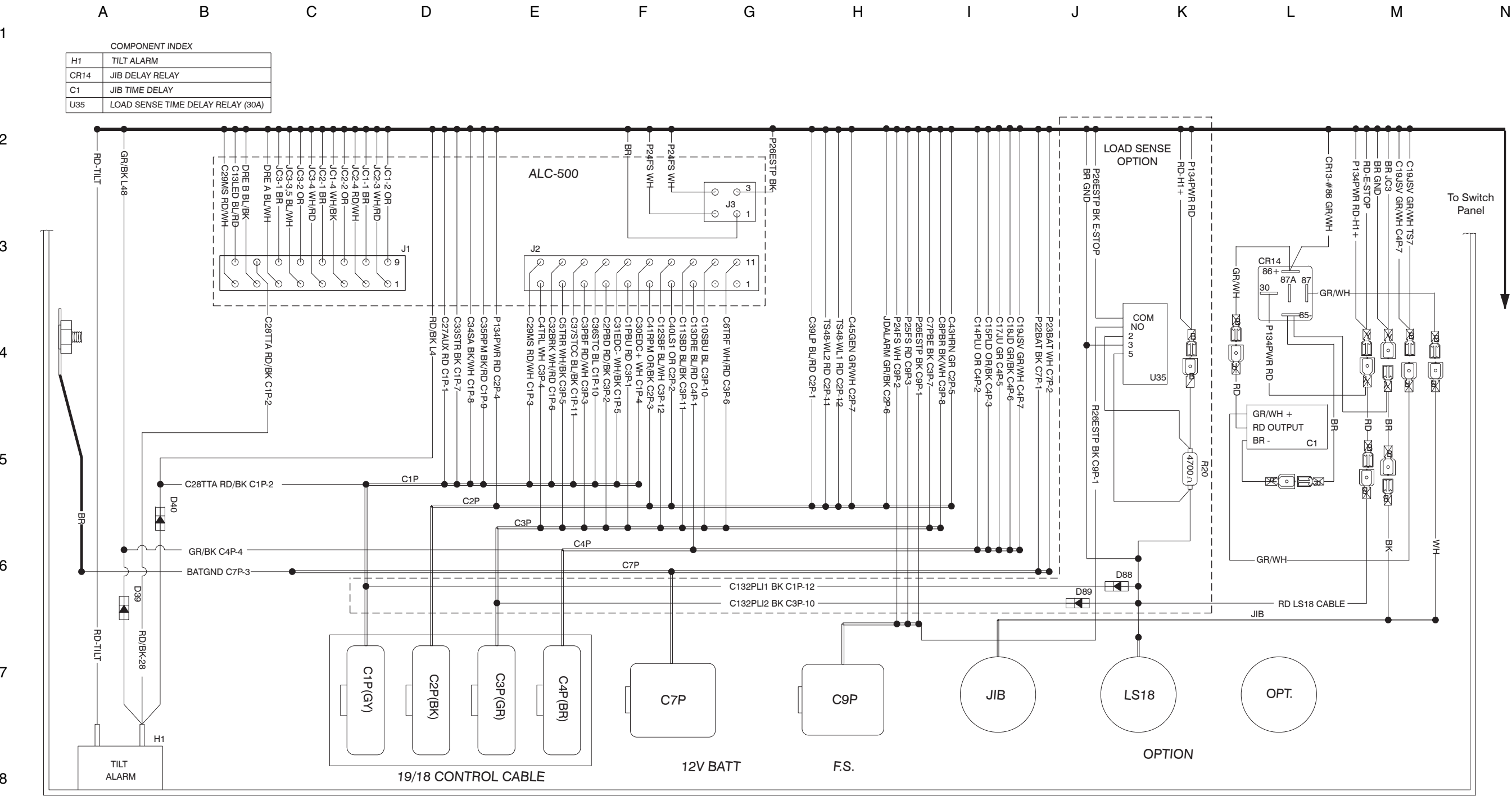


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**Platform Control Box Wiring Diagram - CE**  
Ford MSG-425 EFI Models

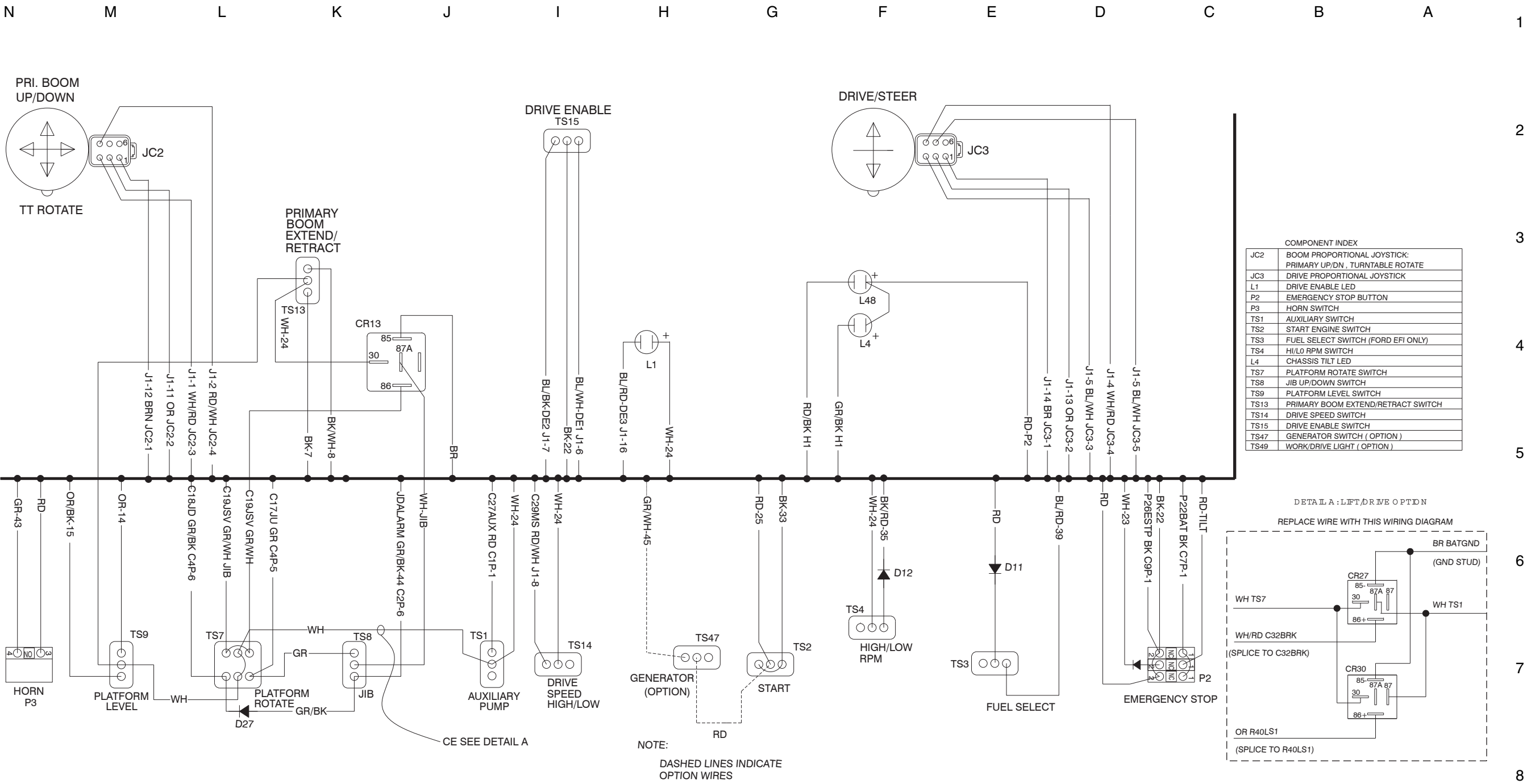


Platform Control Box Wiring Diagram - CE  
Ford MSG-425 EFI Models

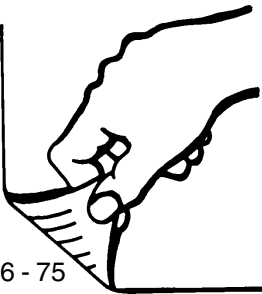




Platform Switch Panel Wiring Diagram - CE  
Ford MSG-425 EFI Models

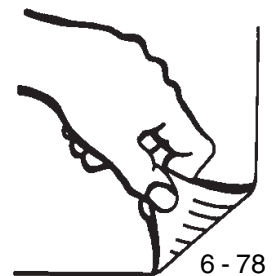
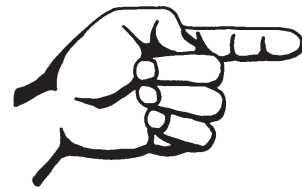


**Platform Switch Panel Wiring Diagram - CE**  
Ford MSG-425 EFI Models

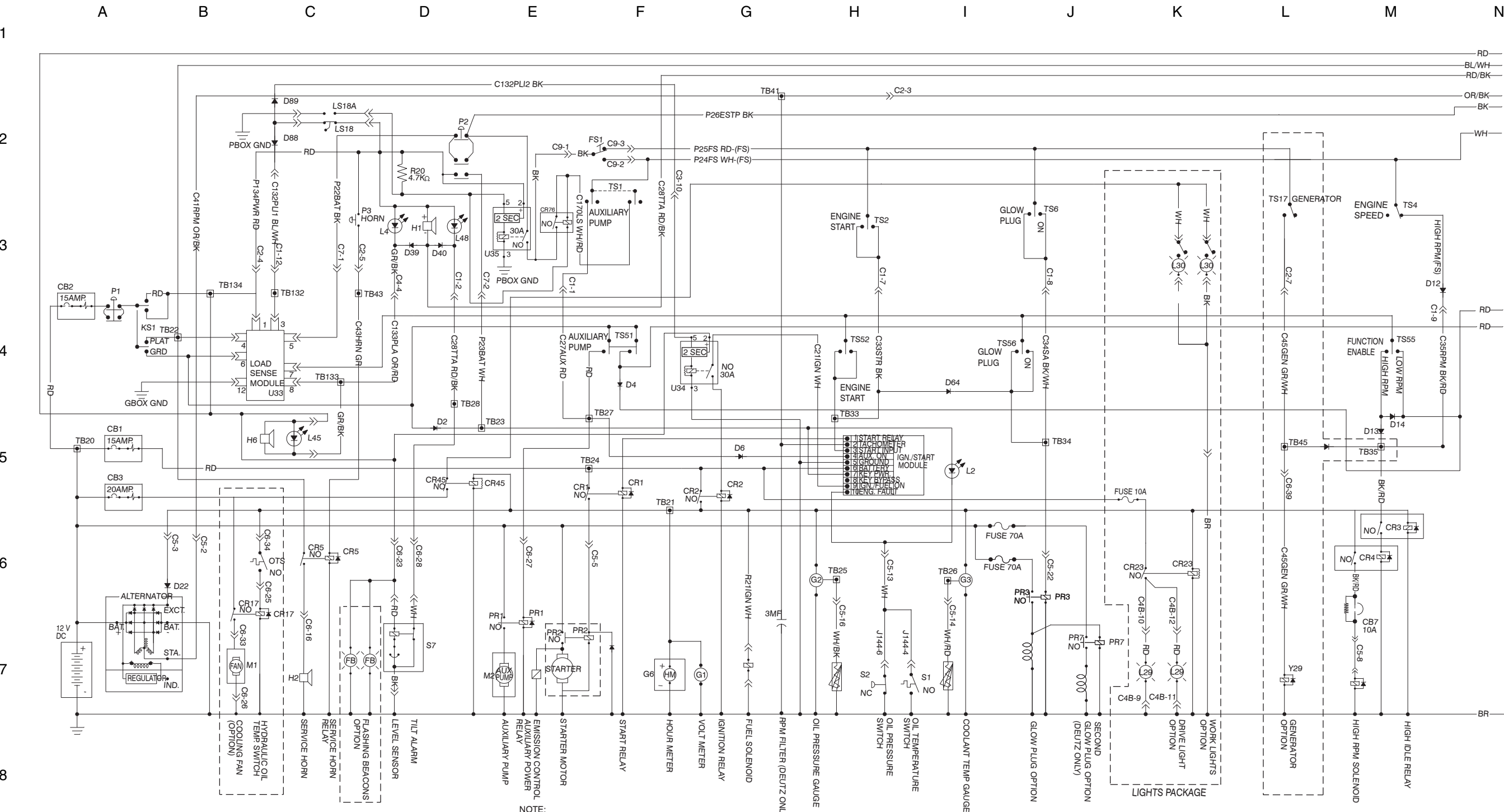


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**Electrical Schematic - AUS**  
Deutz D2011L03i and Perkins 404D-22 Models

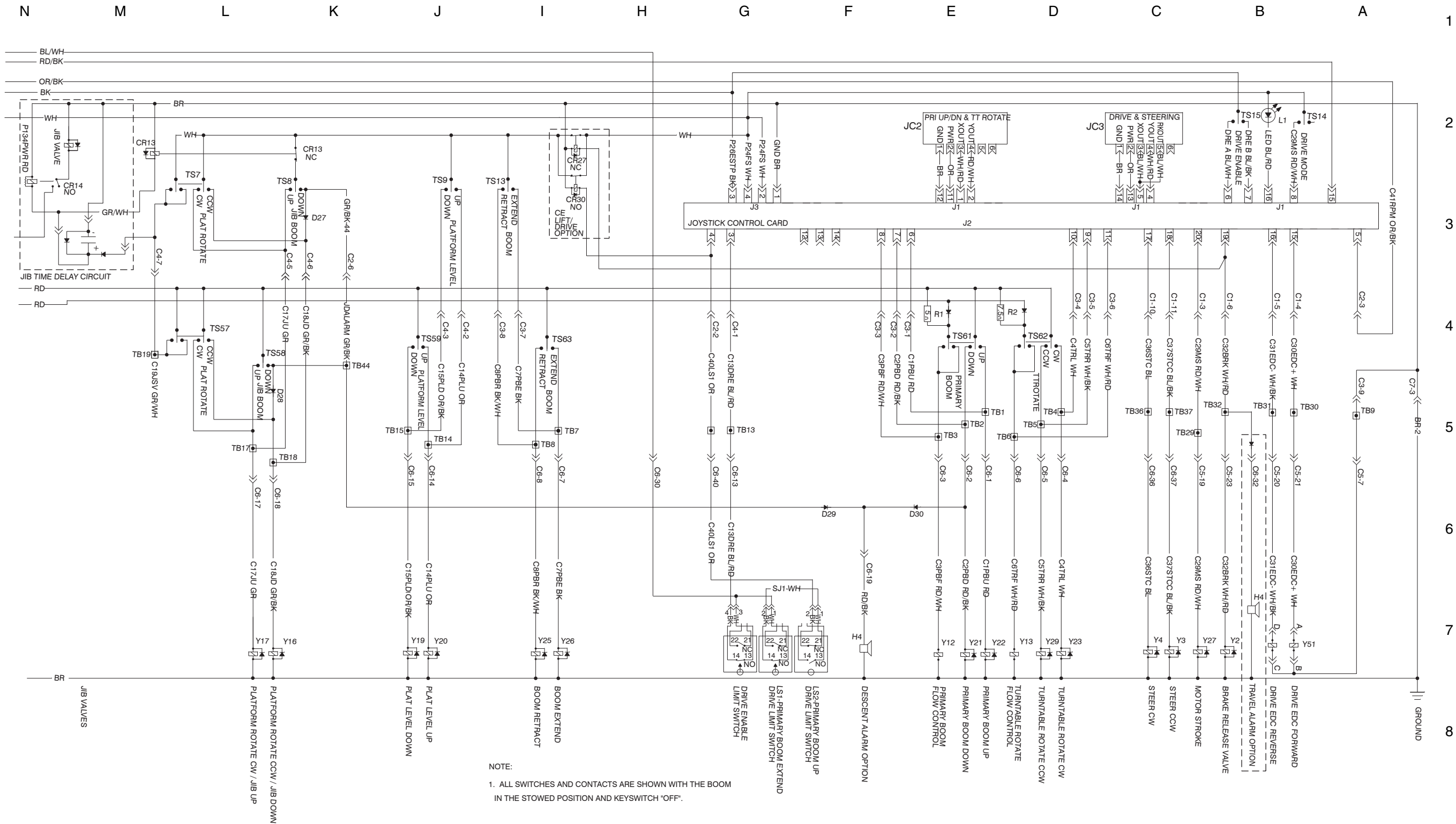


Electrical Schematic - AUS  
Deutz D2011L03i and Perkins 404D-22 Models

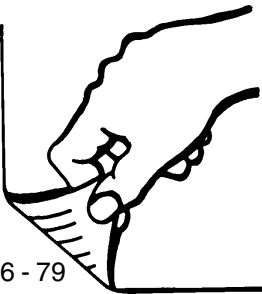


ES0422X

Electrical Schematic - AUS  
Deutz D2011L03i and Perkins 404D-22 Models

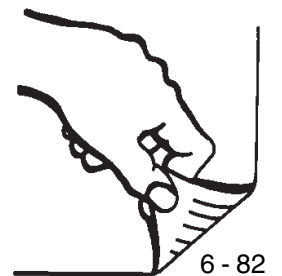
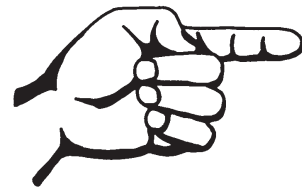


**Electrical Schematic - AUS**  
Deutz D2011L03i and Perkins 404D-22 Models

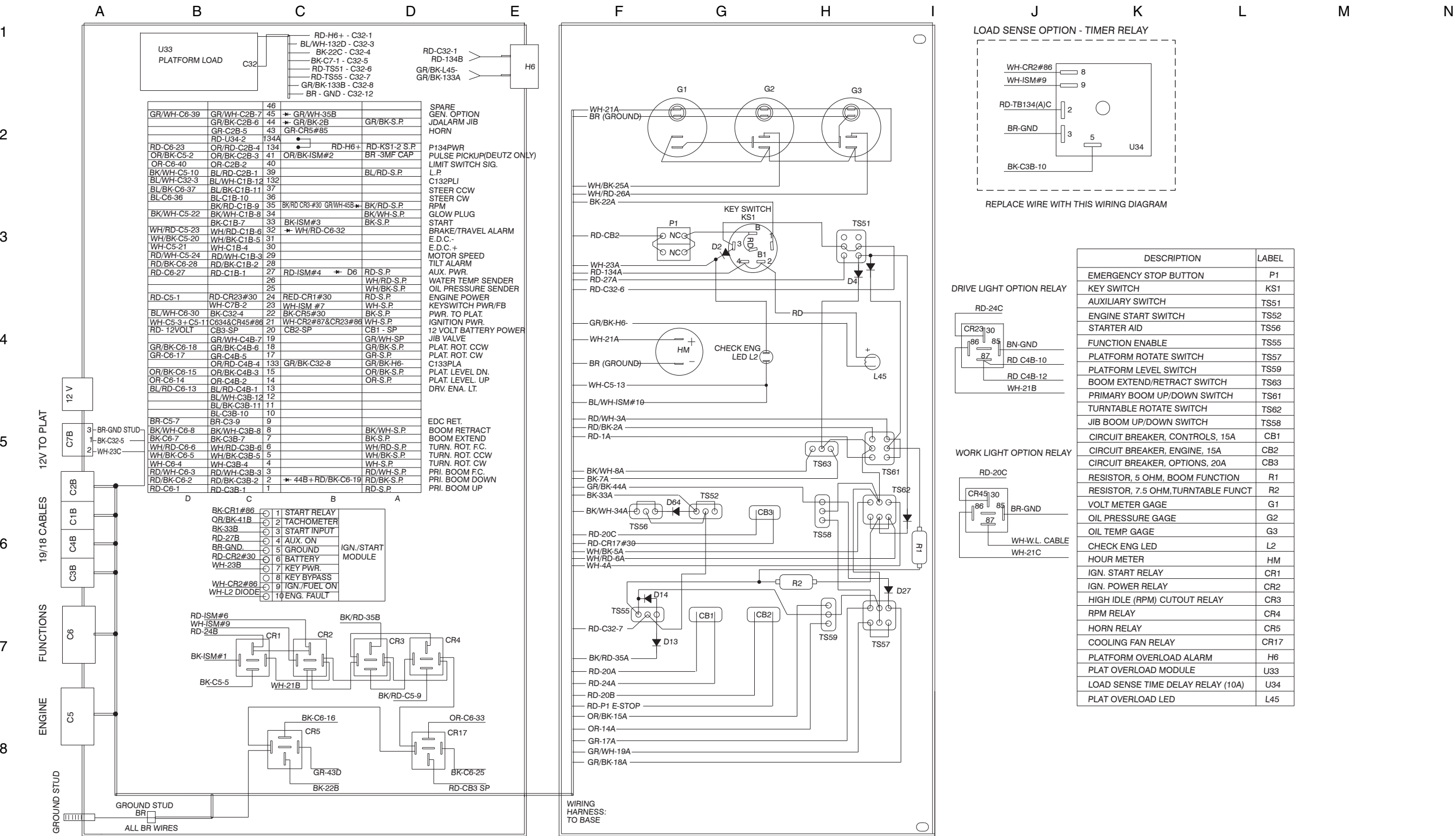


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**Ground Control Box Wiring Diagram - AUS**  
Deutz D2011L03i and Perkins 404D-22 Models



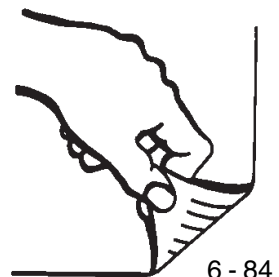
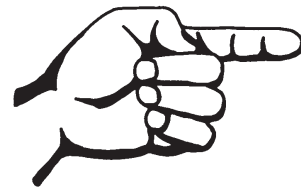
Ground Control Box Wiring Diagram - AUS  
Deutz D2011L03i and Perkins 404D-22 Models



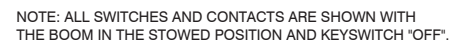


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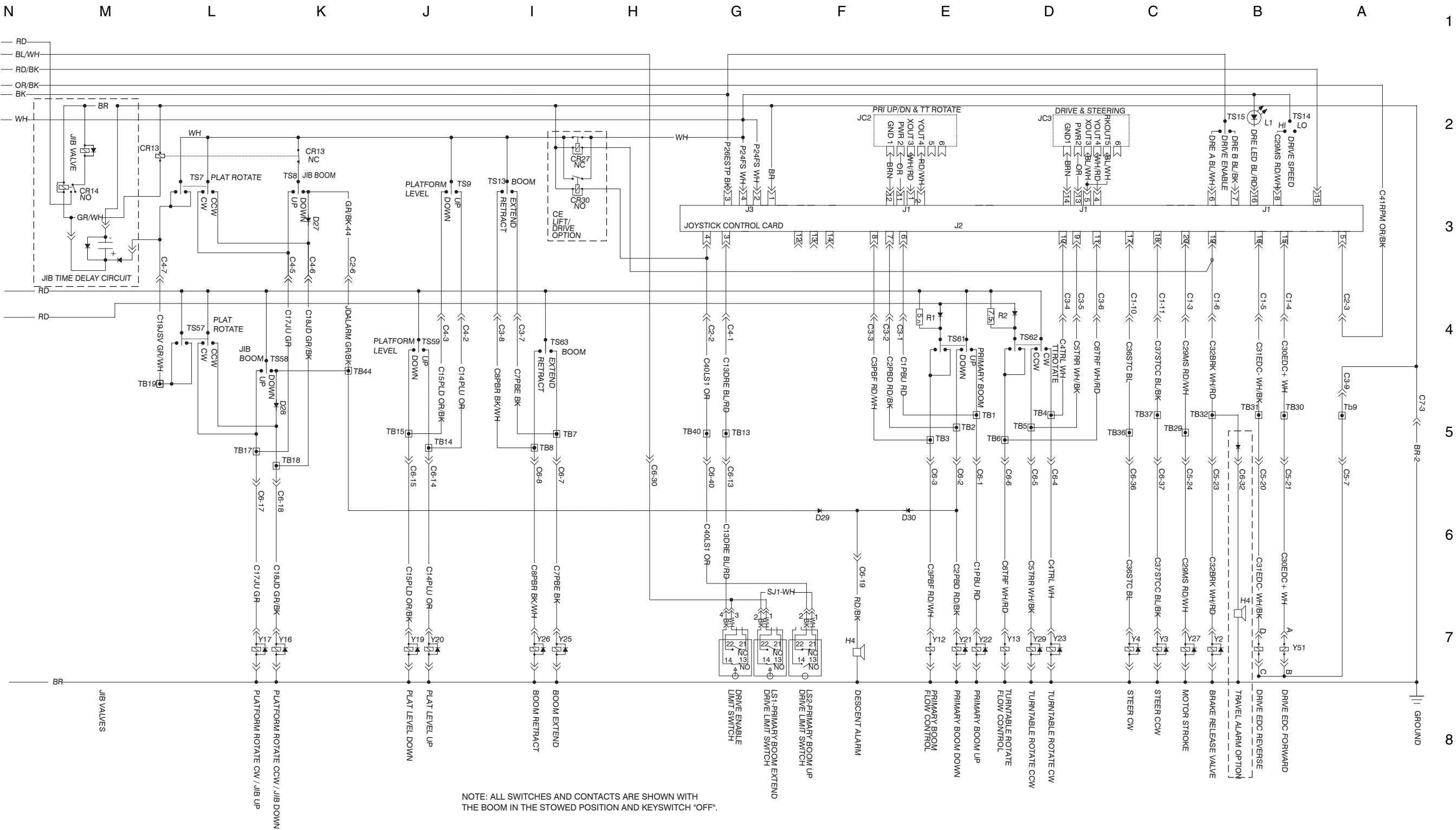
**Platform Control Box Wiring Diagram - AUS**  
Deutz D2011L03i and Perkins 404D-22 Models



## Deutz D2011L03i and Perkins 404D-22 Models



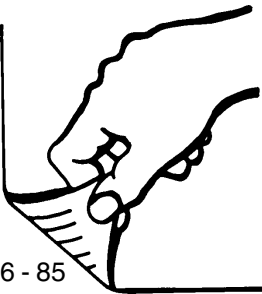
Platform Switch Panel Wiring Diagram - AUS  
Deutz D2011L03i and Perkins 404D-22 Models



NOTE: ALL SWITCHES AND CONTACTS ARE SHOWN WITH THE BOOM IN THE STOWED POSITION AND KEYSWITCH "OFF".

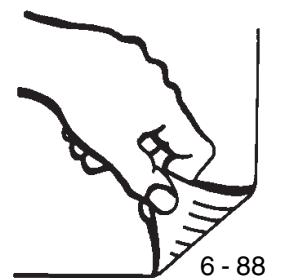
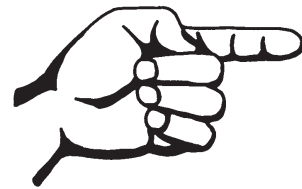


**Platform Switch Panel Wiring Diagram - AUS**  
Deutz D2011L03i and Perkins 404D-22 Models

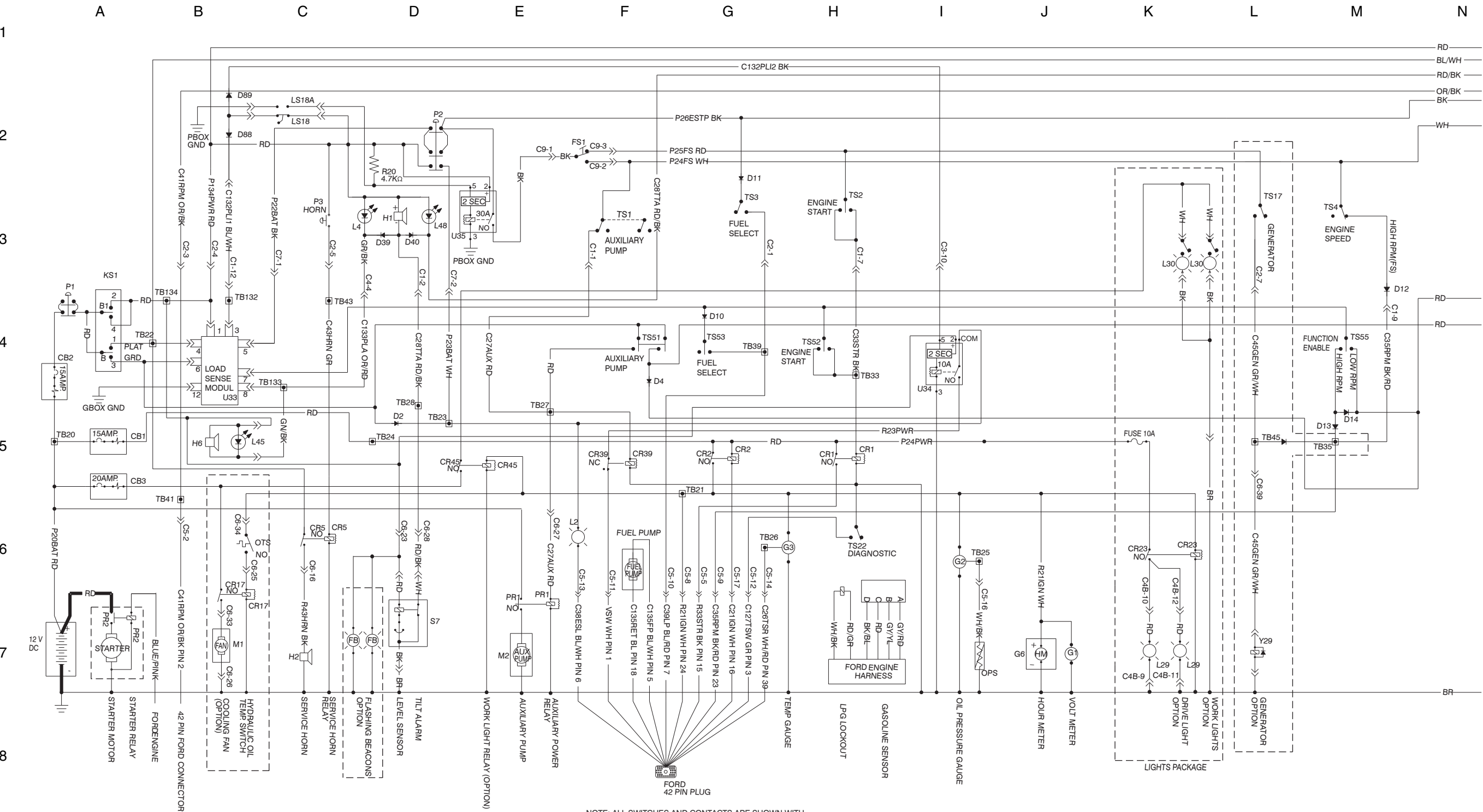


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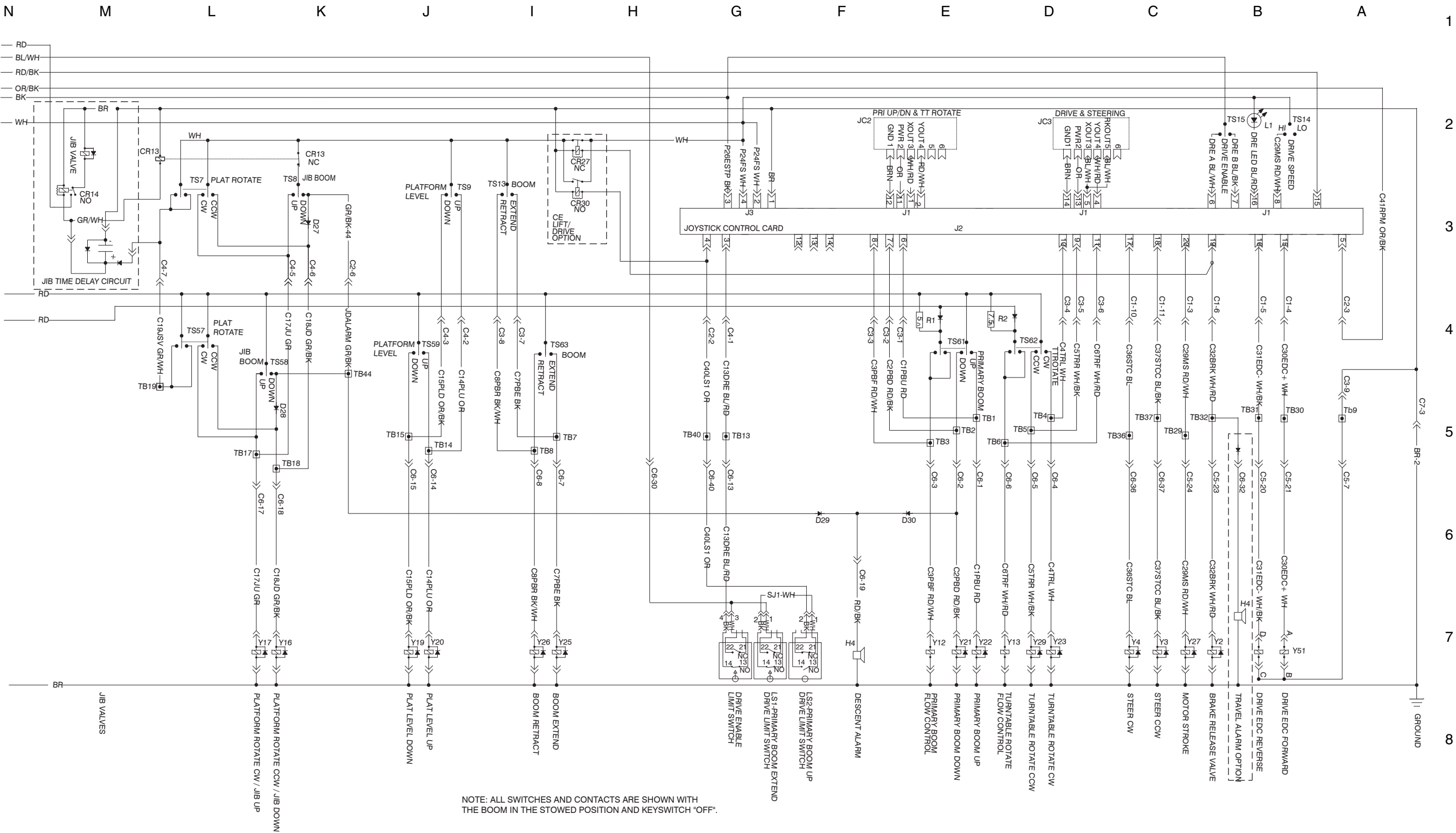
**Electrical Schematic - AUS**  
Ford MSG-425 EFI Models



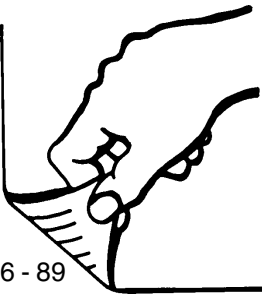
Electrical Schematic - AUS  
Ford MSG-425 EFI Models



Electrical Schematic - AUS  
Ford MSG-425 EFI Models



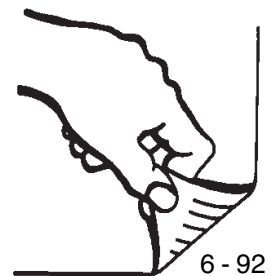
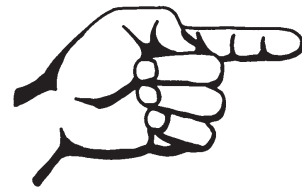
**Electrical Schematic - AUS**  
Ford MSG-425 EFI Models



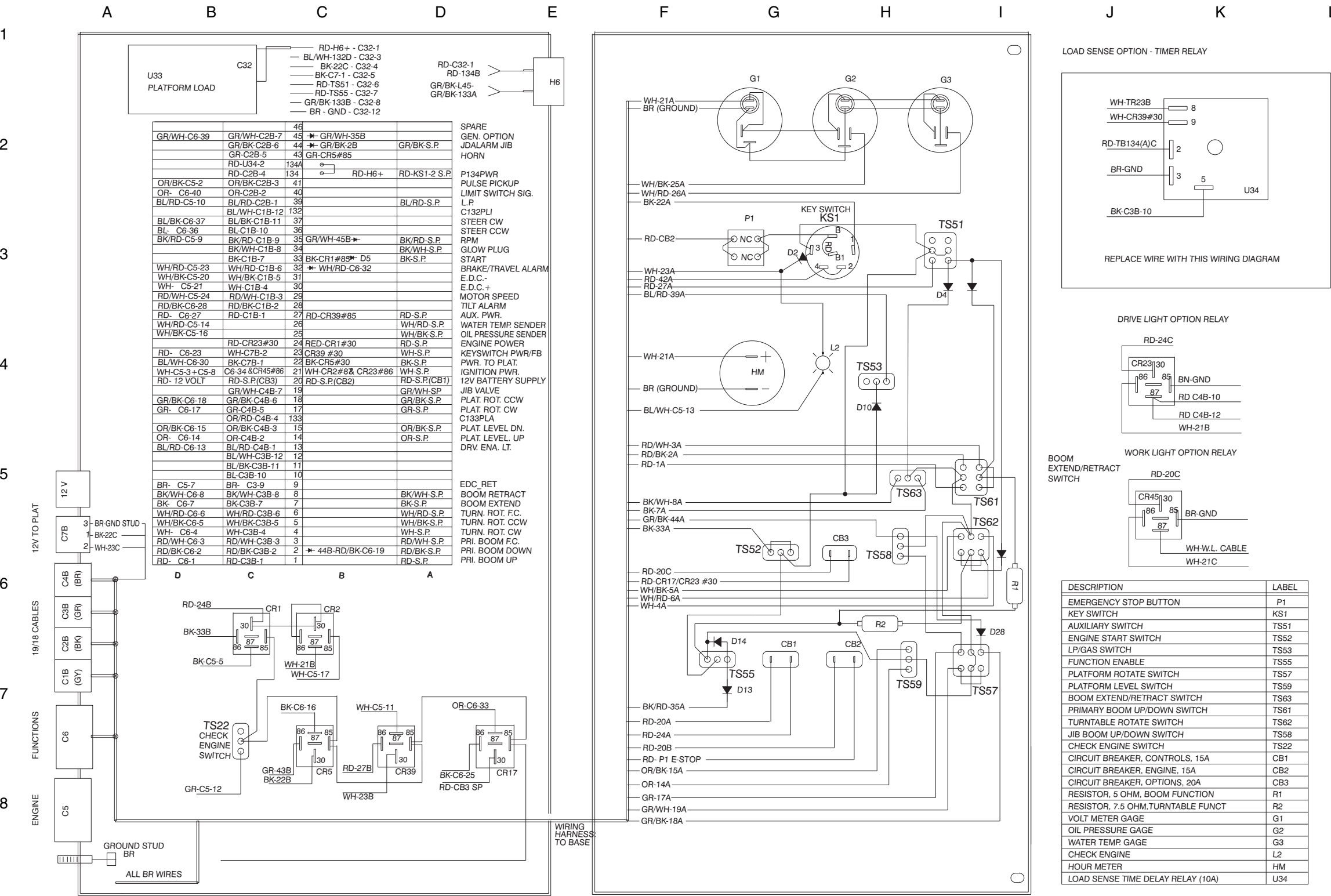


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**Ground Control Box Wiring Diagram - AUS**  
Ford MSG-425 EFI Models

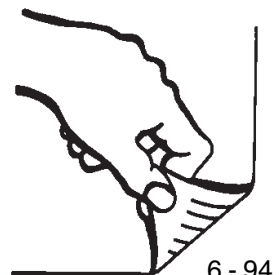
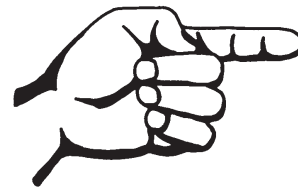


Ground Control Box Wiring Diagram - AUS  
Ford MSG-425 EFI Models



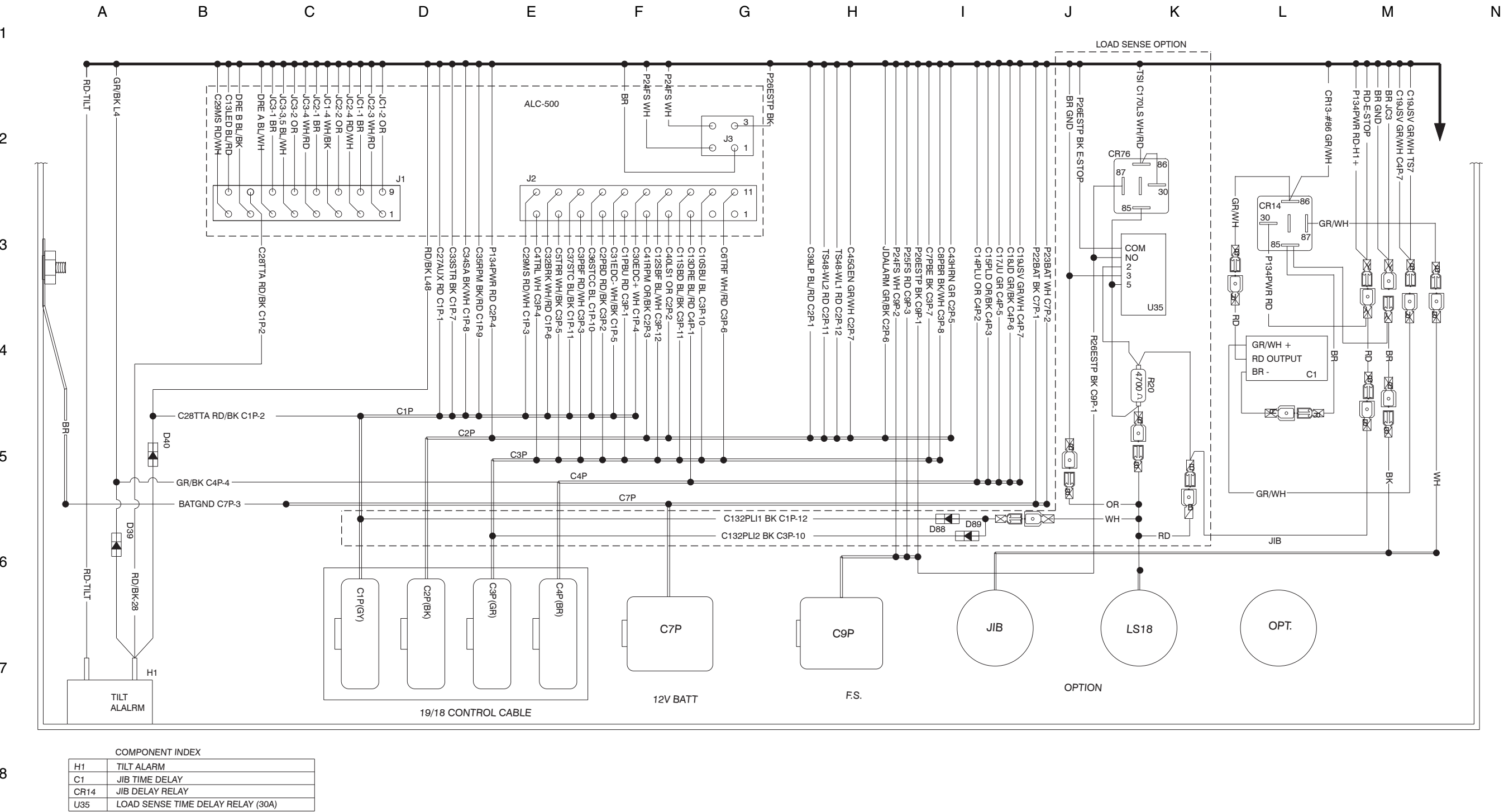
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**Platform Control Box Wiring Diagram - AUS**  
Ford MSG-425 EFI Models

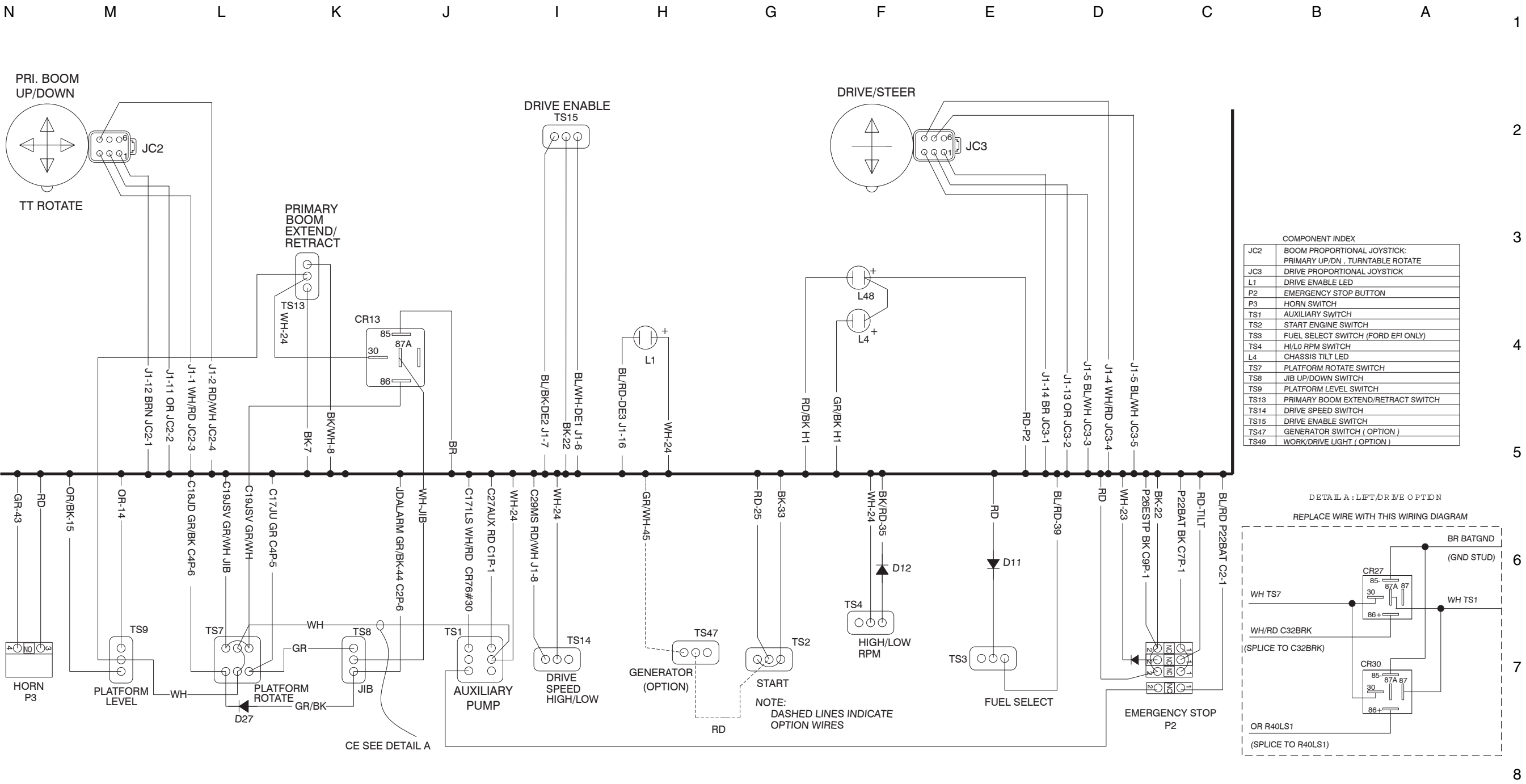


Platform Control Box Wiring Diagram - AUS

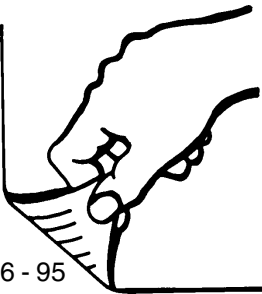
Ford MSG-425 EFI Models



Platform Switch Panel Wiring Diagram - AUS  
Ford MSG-425 EFI Models

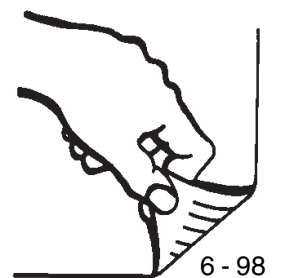
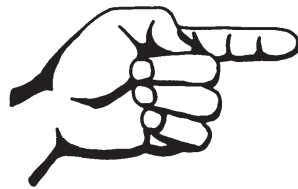


**Platform Switch Panel Wiring Diagram - AUS**  
Ford MSG-425 EFI Models

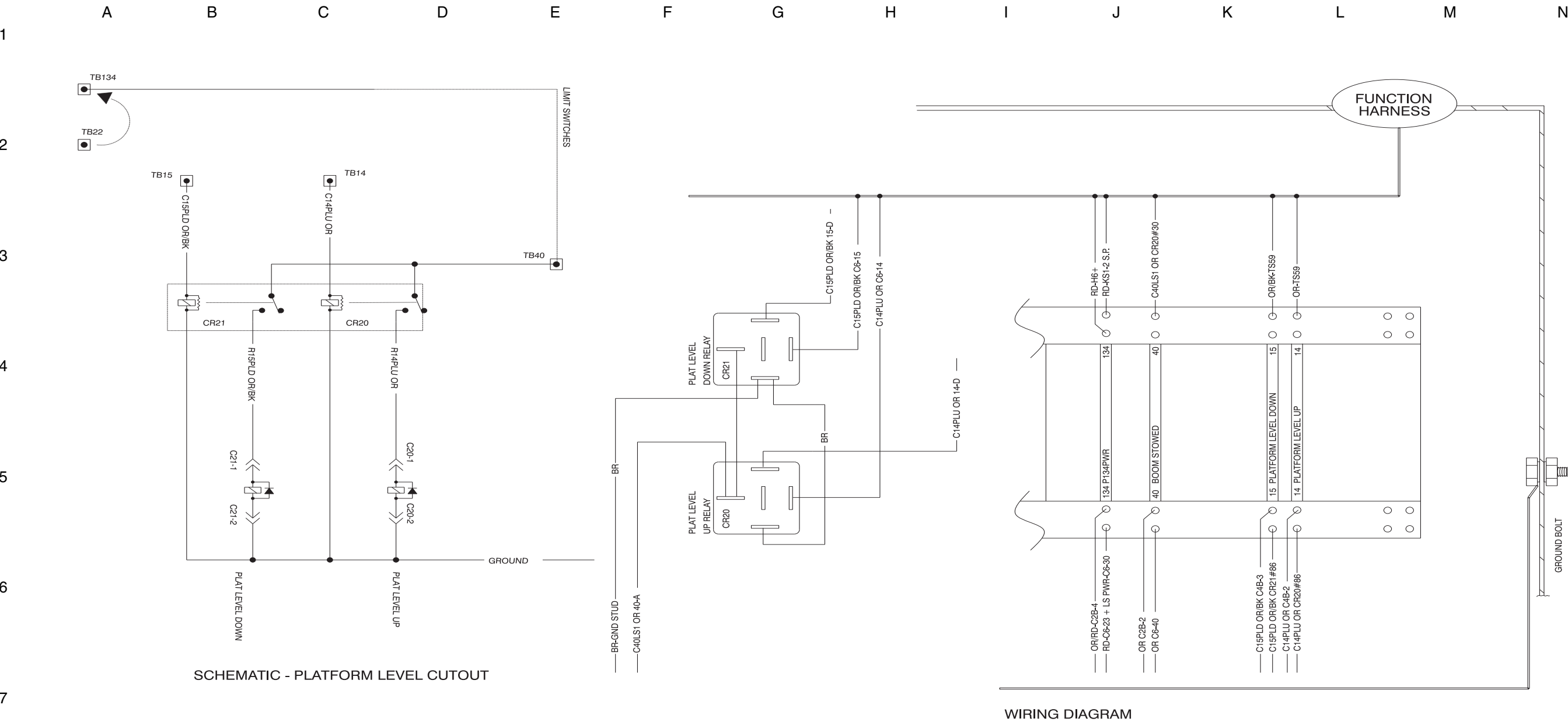


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## CTE Option Wiring Diagram

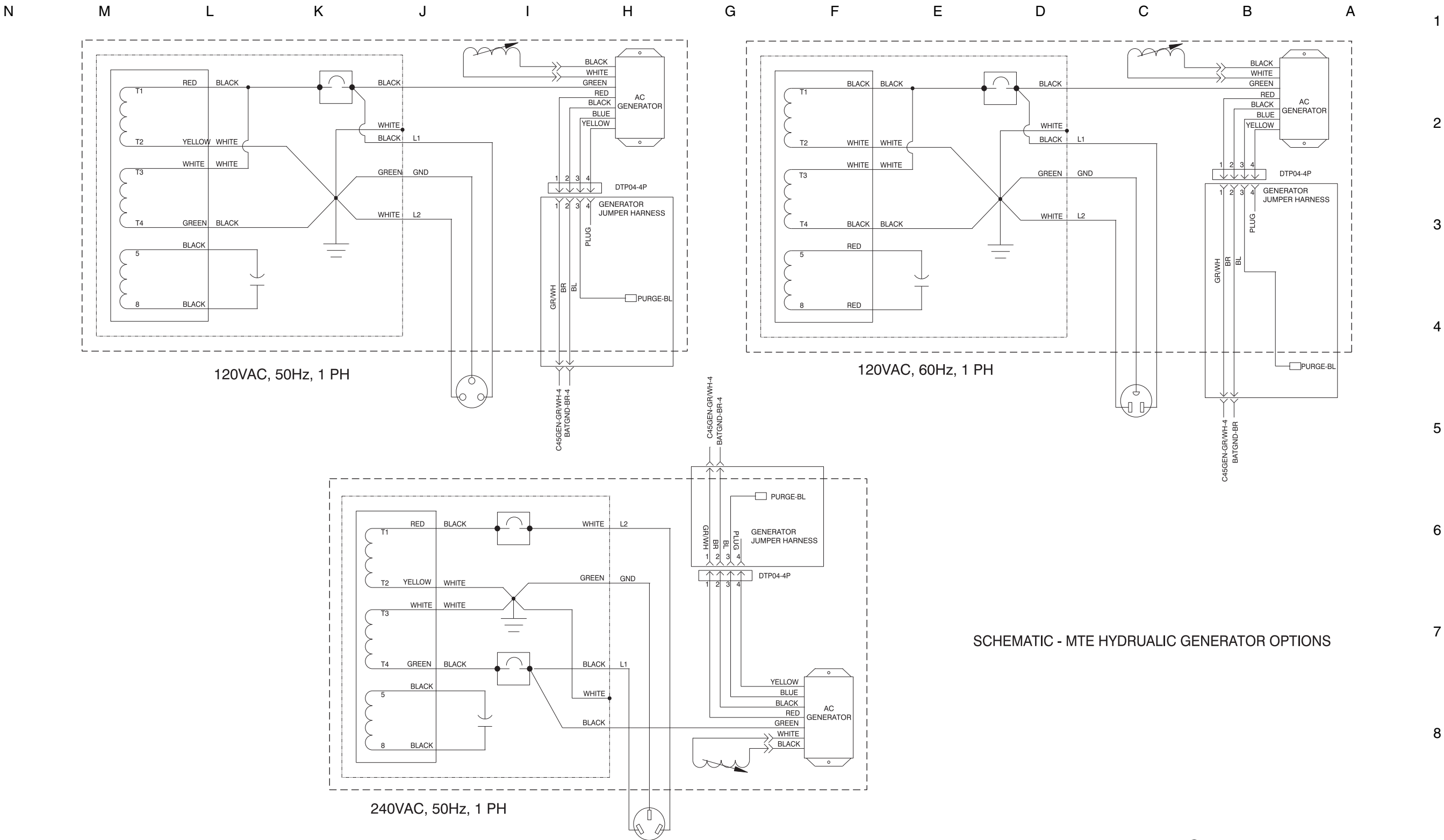


CTE Option Wiring Diagram



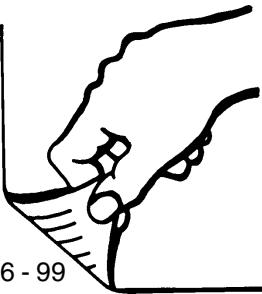


Hydraulic Generator Option Wiring Diagram- MTE



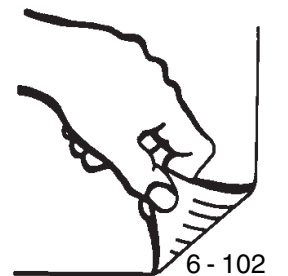
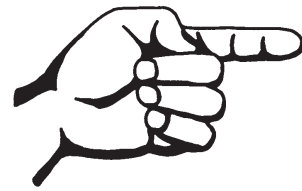
SCHEMATIC - MTE HYDRUALIC GENERATOR OPTIONS

Hydraulic Generator Option Wiring Diagram- MTE

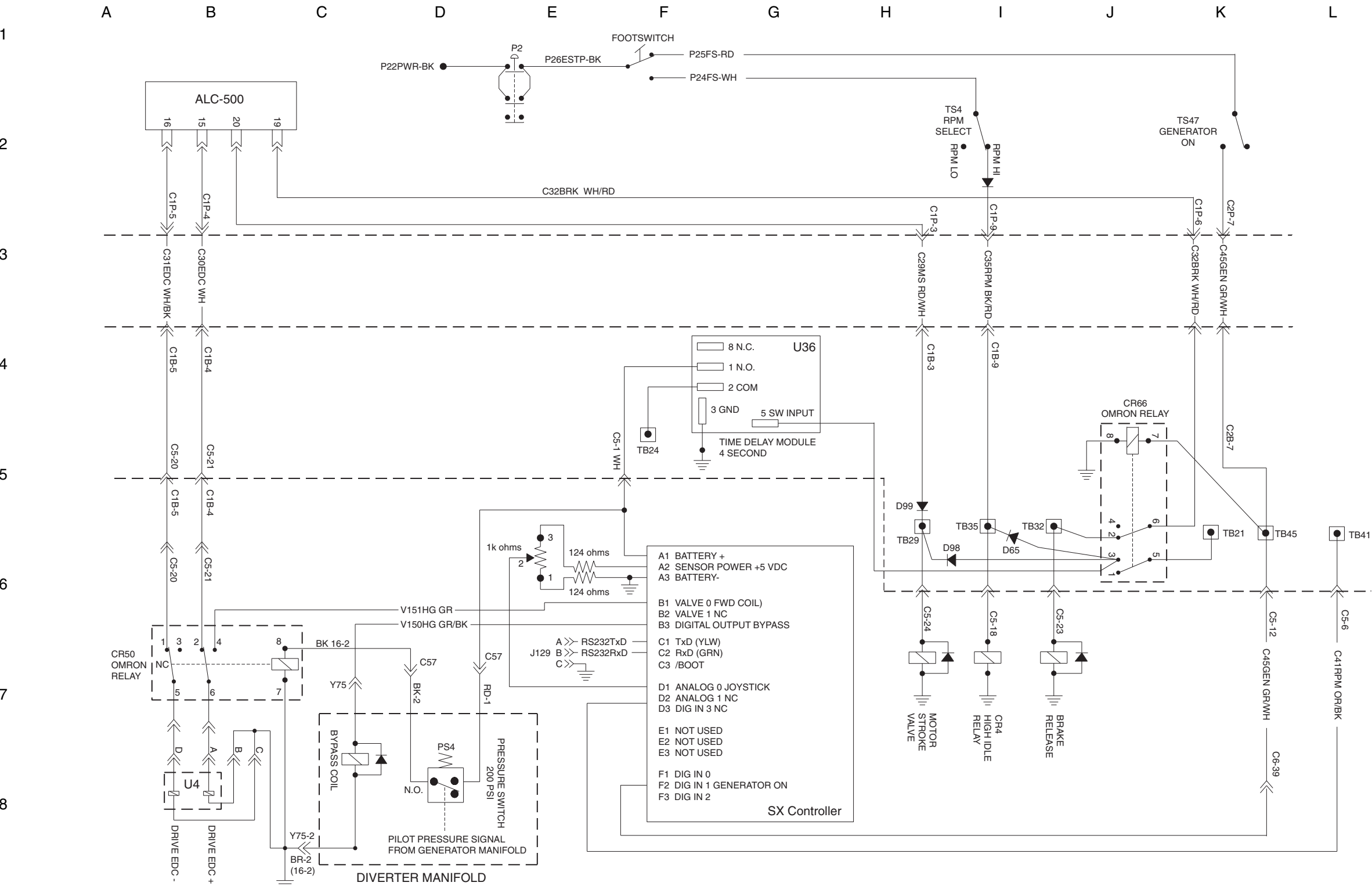


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## 12.5 kW Hydraulic Generator Electrical Schematic- Welder Option



12.5 kW Hydraulic Generator Electrical Schematic- Welder Option



12.5 kW Hydraulic Generator Wiring Diagram- Welder Option

N

M

L

K

J

I

H

G

F

E

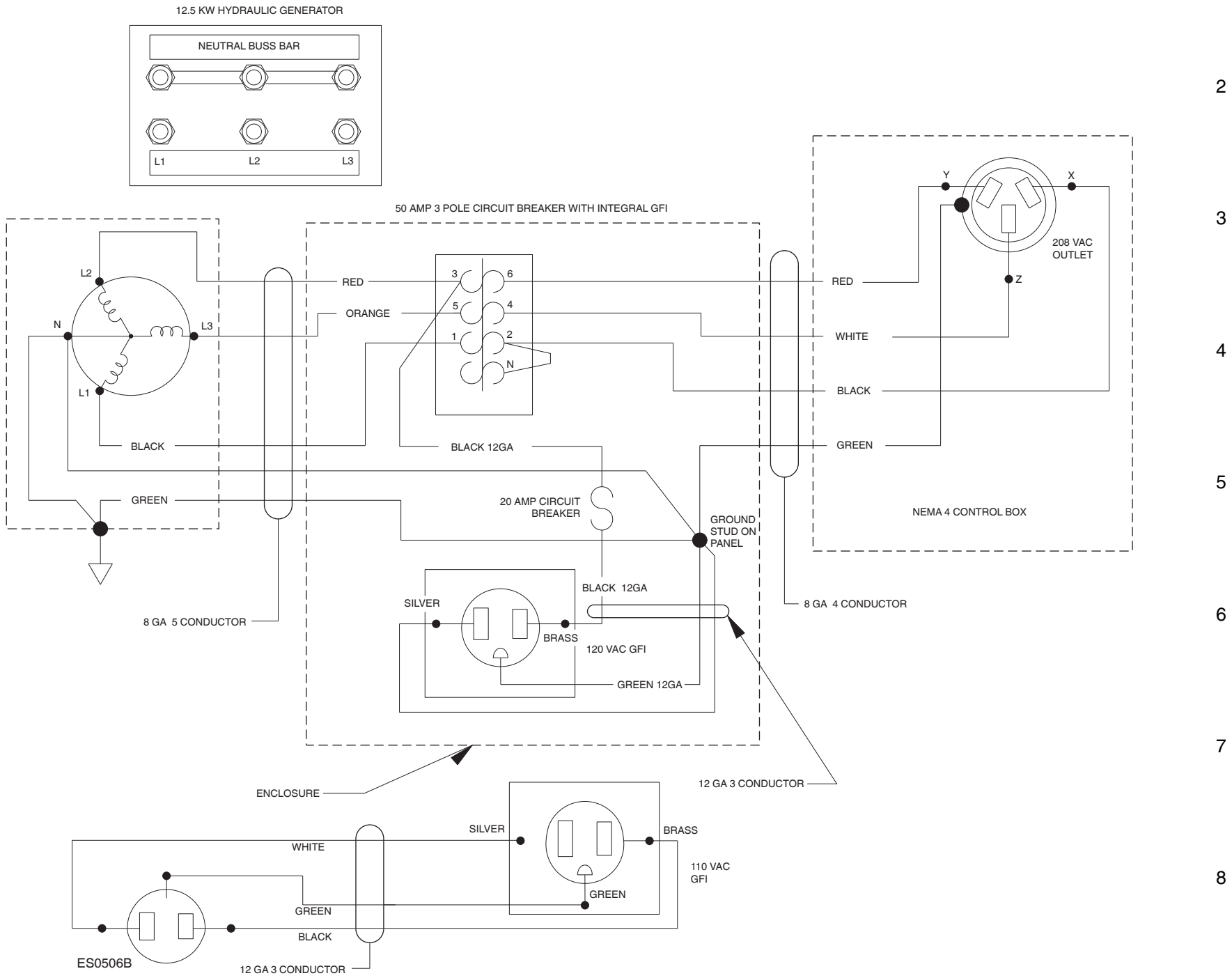
D

C

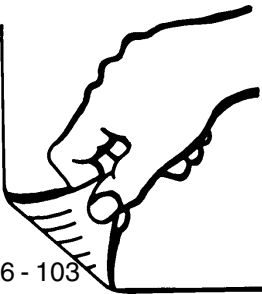
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A

1

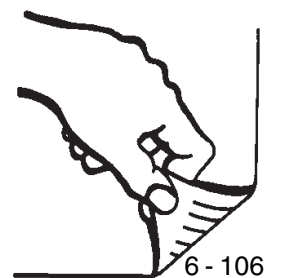
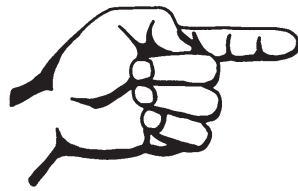


**12.5 kW Hydraulic Generator Wiring Diagram- Welder Option**

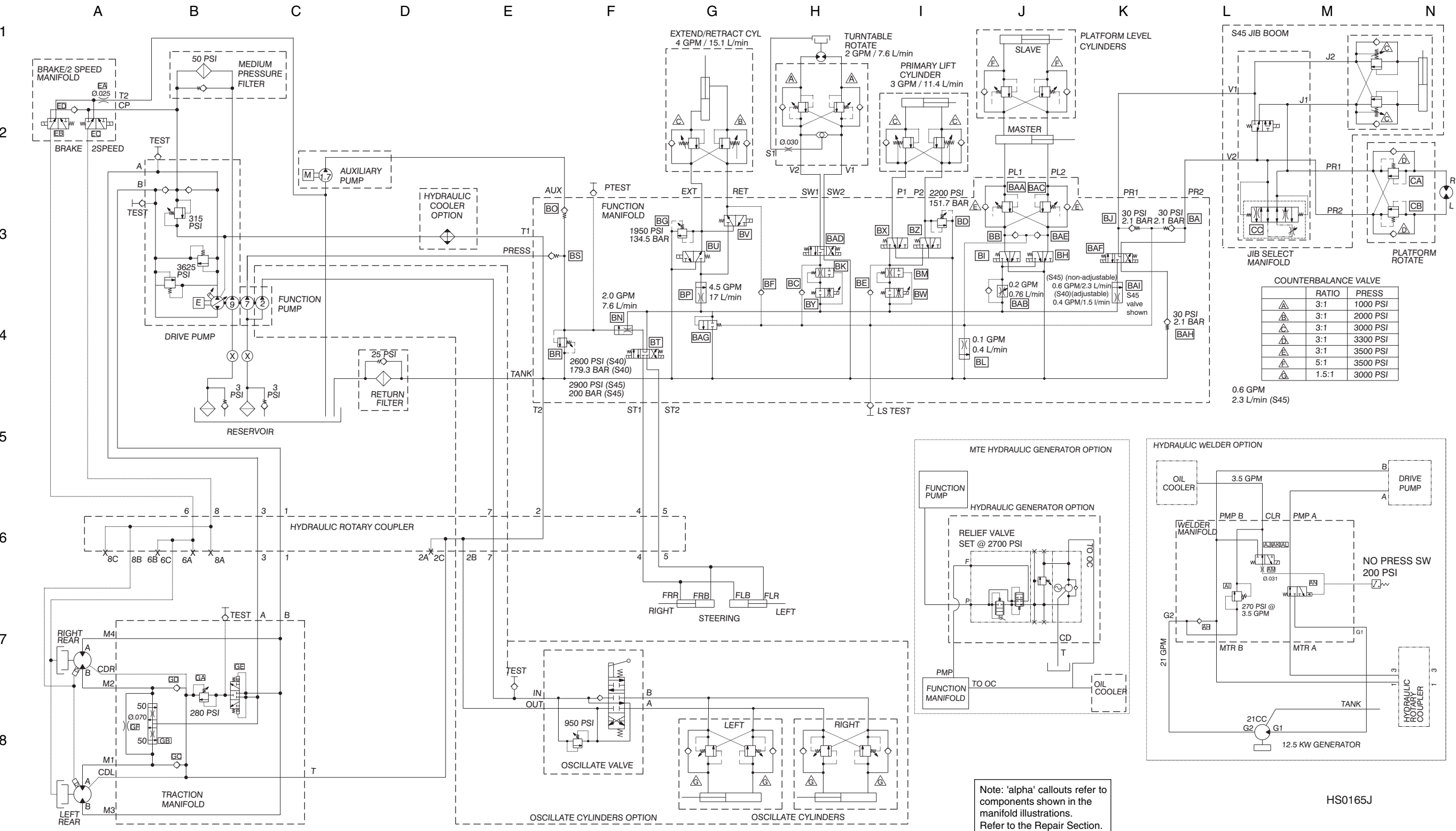


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## 2WD Hydraulic Schematic

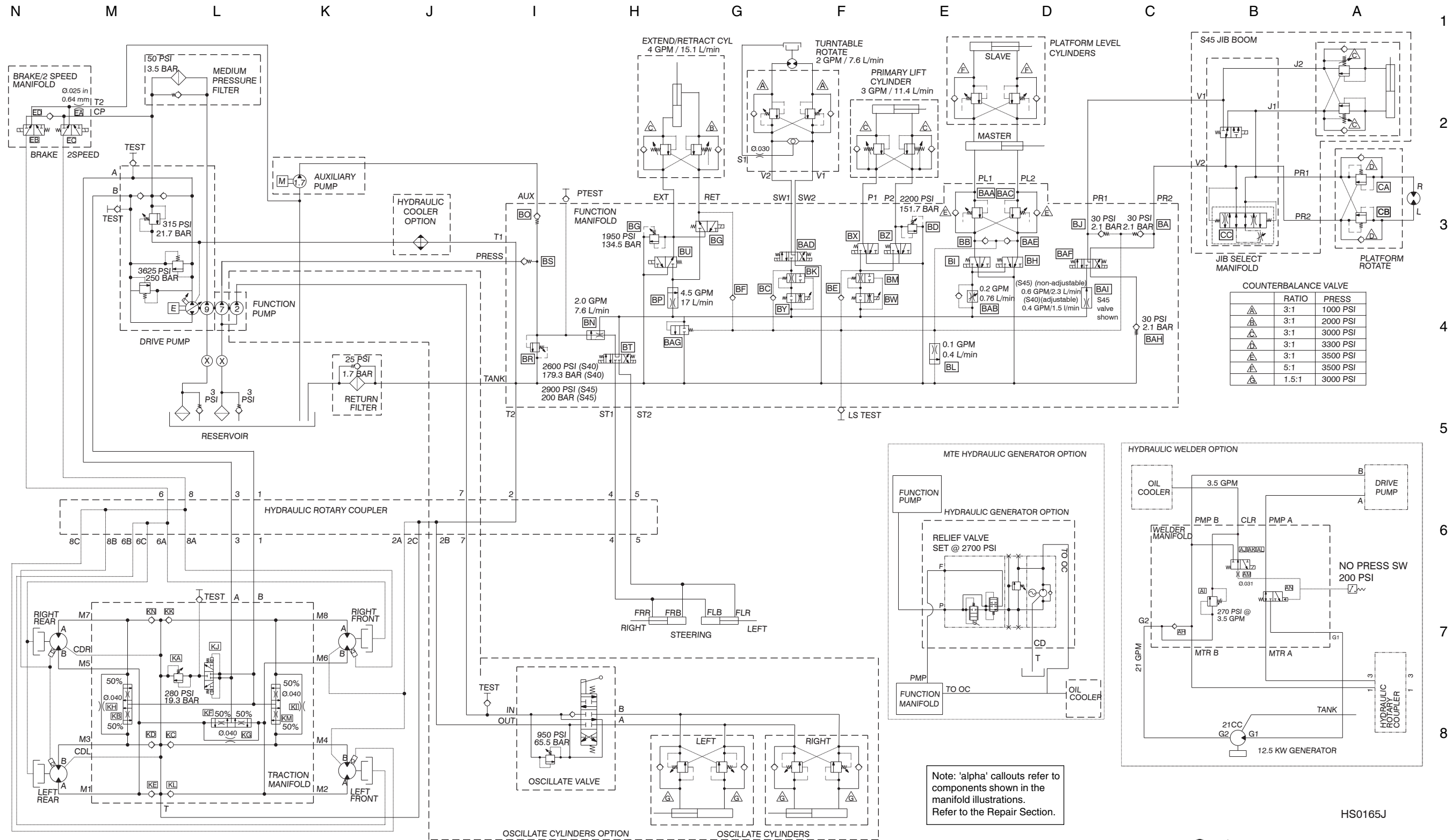


2WD Hydraulic Schematic



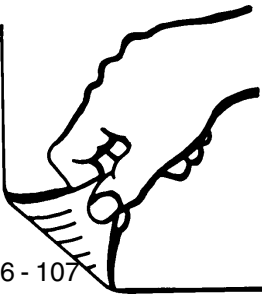


4WD Hydraulic Schematic



HS0165J

4WD Hydraulic Schematic



California Proposition 65

## Warning

The exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm.

Distributed By:

Genie North America  
Phone 425.881.1800  
Toll Free USA and Canada  
800.536.1800  
Fax 425.883.3475

Genie Australia Pty Ltd.  
Phone +61 7 3375 1660  
Fax +61 7 3375 1002

Genie China  
Phone +86 21 53853768  
Fax +86 21 53852569

Genie Singapore  
Phone +65 67533544  
Fax +65 67533544

Genie Japan  
Phone +81 3 6436 2020  
Fax +81 3 5445 1231

Genie Korea  
Phone +82 2 558 7267  
Fax +82 2 558 3910

Genie Brasil  
Phone +55 11 4082 5600  
Fax +55 22 4082 5630

Genie Holland  
Phone +31 183 581 102  
Fax +31 183 581 566

Genie Sweden  
Phone 0046 3157 5101  
Fax 0046 3157 5104

Genie France  
Phone 0033 237 260 986  
Fax 0033 237 260 998

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Phone 0049 4221 491 821  
Fax 0049 4221 491 820

Genie U.K.  
Phone 0044 1476 584 333  
Fax 0044 1476 584 330

Genie Mexico City  
Phone +52 55 5666 5242  
Fax +52 55 5666 3241

# **Service Manual**

## **S-40 • S-45 • S-40 TRAX • S-45 TRAX**

*(from serial number  
S4012-17232)*

Part No.  
826364

Rev C

